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## CONDITION OF THE RUBBER-SHOE TRADE.

THE feature of chief interest in the rubber industry of late has been the condition of the shoe trade. With the present month ends the limit of time for the extra jobbers' discount of 5 per cent., and it is not too early to discuss the effect of this experiment. Hitherto there has been a hesitancy to place orders for rubber footwear until the latest possible date. The result often has been a congestion of orders with the first snowfall, with a result unsatisfactory to all concerned unless manufacturers happened to have left-over stocks on hand.

The announcement in April last of an extra discount on all goods accepted by jobbers before September 1, and on stocks placed by jobbers in the hands of retailers by October 1, led to a change in trade methods, for 5 per cent. is a big item in these days of selling on close margins. The result has been an unprecedented run of summer orders, despite the dullness of business generally. The mills have been kept busy, the number of traveling salesmen has been increased, and jobbers have distributed more goods than ever before in the summer months. Naturally the manufacturers have not complained at this state of affairs. It was worth the 5 per cent. to them, we are assured, to have the orders in early for the winter's demand.

It is true that the prospect is for a stoppage of the shoe-factories early in next month, but this will only be postponing for awhile the customary summer shut-down. The operation of the mills, however, will be determined largely by the weather. Should a severe winter occur, the mills, having turned out all the goods needed for the opening of the season, will be in good condition to supply promptly any further demands for footwear. Whether or not this extra inducement to the trade to buy early, and thus to equalize the distribution of goods through the different months, may be repeated, there can hardly be a question as to its having resulted satisfactorily on its first trial.

There are other features that have tended to a satisfactory condition of the rubber-shoe trade of late. First, it has not been upset by the interminable tariff tinkering at Washington. Then the stability of prices due to the removal of a demoralizing sort of competition has given buyers a confidence in placing their orders. Finally, the quality of the product is higher to-day and more uniform than ever before, while prices have not exceeded a reasonable scale. On the whole, the situation of this trade is as satisfactory as that in any other line, if not more so. That this is true, in the face of undisputed hard times, is not due to accident, but to the exercise of good judgment on the part of the leaders in the trade. System, conservative methods, honest goods—these tell the story.

## IS THE TORRES SYSTEM PRACTICAL?

RUBBER-MANUFACTURERS have ever been confronted by the fact that crude rubber, although it may apparently run the same day in and day out for weeks, varies in its physical and chemical properties. In

the finer grades of goods excellent results may be obtained from one lot of rubber, while from another, exactly similar according to every known test, pin-holes, blisters, and various other troubles result. Such troubles are laid first to the whiting, then to the sulphur, the manipulation, and finally, all of these having been proved blameless, to the rubber itself. How often the crude rubber may be the cause of damaged goods is a question. That it always may be a cause, until the methods of gathering are reduced to an exact science, is probable. Hence it is that any attempt to reach this end, such as the Torres system for example, always receives due consideration on the part of manufacturer and importer.

This system, which is explained at length on another page, has thus far been applied only to Pará rubber, the rubber with which there is the least trouble, and that is most thoroughly understood. It may be that, by reducing the proportion of medium and sernamby, there will be so great an increase of fine that considerable gain may result. It is possible further, that a few manufacturers of specialties may wish to import the milk, and treat it in their own way, thus assuring themselves that all of the manufacturing details are under their own supervision. The vast majority, however, would not know what to do with rubber-milk if they had it, and it is extremely unlikely that they would pay extra freight, and fit up a smoking- or coagulating-plant, even were such a thing possible. It looks as if work had been expended where it is not needed. Now, if the worthy inventor had produced a system, simple and practical, that would enable the gatherers of the African gums to produce an article as clean and sweet and reliable as the Pará rubbers, he would be sure of attention, and of a fortune as well. *There* is the crying need in the crude-rubber line to-day. In the past five years manufacturers have learned to use almost every grade of Africans and kindred gums, but they are always afraid of them. Were these grades always alike, were they free from bark, sand, and other foreign matter, they would be worth more to manufacturer, importer, and gatherer, and, if our Brazilian friend solved the problem, worth more to him.

## A NEW RUBBER-SHOE FACTORY.

WHAT is known as the Providence Rubber Shoe Co. has just been started in Providence, R. I., and by fall will be in full operation. The business is to be run by ex Governor A. O. Bourn, and, although the name of the concern would indicate that it is a corporation, it is not such in reality, but is practically the property of Mr. Bourn. The plant that is to be operated is situated on Westfield street in Providence, and was some years ago run as a manufactory for rubber shoes. It was then known as the Brown Rubber Co., and made a great many goods for C. M. Clapp & Co. under the Ætna brand. Later the plant was sold to Eugene Phillips, and used as a part of the insulated-wire plant of the American Electrical Works. The buildings, although not large, are well adapted for turning out a limited number of shoes daily. The machinery that is now being put in place consists of one worker, six grinders, one 60 inch, 3-roll, calender of Birmingham make, a 125 horse-power Corliss engine, one rotary calender, heel-presses, heaters, etc.

Governor Bourn was away when the representative of THE INDIA RUBBER WORLD called, but his son, an active young man of twenty-five, was superintending the setting of the machinery. He willingly gave such information as was sought, at the same time frankly admitting that he was not at all up in the rubber business.

"It will only be a small mill," he said; "just enough to give my father an opportunity to busy himself about a business with which he is perfectly familiar, in which he has done much in the past, and one that he is still deeply interested in. We shall make only shoes, and those of the very best quality. We shall employ about three hundred hands, and, judging from the way that they are applying even thus early, we shall have no difficulty in obtaining all the help we want. My father plans to be his own superintendent for the present at least, and both he and I shall come up to the factory every day from our home at Bristol. Part of our machinery we bought of C. M. Clapp, owner of the Ætna Rubber Mills, Jamaica Plain, Mass. I am of the opinion that he is a stockholder, but am not sure."

## THE PAN-AMERICAN EXHIBIT.

A PERMANENT Pan-American exhibit is to be opened in New York in the near future, as soon as the arrangements now in progress are completed. The object is to bring before visitors from Southern American republics samples of the goods offered by American manufacturers in all lines of trade and business. A library containing the catalogues of every manufacturing concern in the United States will be accessible to the visitors, and private consultation rooms will be furnished. Typewriters, interpreters, and stenographers are to be furnished gratis to those desirous of transacting business with the exhibitors. So far the carriage, hardware, machinery, shipbuilding, and many other trades have applied for space. Several rubber-manufacturers were seen by a representative of THE INDIA RUBBER WORLD, and while one or two said they would not exhibit and could see no advantage in the plan to the rubber trade, others have expressed great interest in the plan and said that they might exhibit if they were acquainted with the details of the scheme. No invitations to exhibit have been received by them,—at least, they have no recollection of any, though they may have heard from the secretary of the exhibition months before the scheme was ripe and have forgotten all about it. They will, however, look into the matter, and as the Pan-American exhibit is to be a permanent one, and occupy a large and high building, there will probably be no difficulty in obtaining space should the rubber manufacturers decide to exhibit.

RECENT imports of Balata at New York have been: July 10, by the *Irrawaddy* (Port Spain) 28 bales, Stockbridge & Co.; July 15, by the *Orange Nassau* (Paramaraibo) 4 cases, 38 bags, Earle Brothers; August 5, by the *Prinz Wilhelm* (Paramaraibo) 1 bag, D. A. de Lima & Co., and 10 cases, 33 bags, Earle Brothers. The total weight, it is estimated, amounted probably to 15,000 pounds.

# THE USE OF INDIA-RUBBER AND GUTTA-PERCHA IN MEDICINE.

*By A. E. Davis, M. D. (New York.)*

WITH one or two exceptions, perhaps, to no other articles of commerce is modern medicine so much indebted for its success as it is to India-rubber and Gutta percha. This indebtedness exists, to a greater or less extent, in every department of medicine—general medicine, general and special surgery, chemistry, laboratory-work, dentistry, and hygiene. The uses of these gums have been so manifold and their application so extensive in the practice of the "healing art," that even the far-reaching phrase, "from the cradle to the grave," seems not to be broad enough to embrace these articles. In this day of *hygienic* medicine, we are ushered into the world on a protective rubber sheet, using it therefore before the cradle!

Torquemada, who called attention in 1615 to the tree that produced India-rubber, remarked the use of an oil obtained from this gum by means of heating (no doubt the same oil that we now obtain by heating the gum—*caoutchoucin*), that was "of especial effect in removing tightness of the chest, and was also drunk with cocoa to stop hemorrhage." This seems to be the earliest mention of the use of rubber in medicine.

Gutta-percha was introduced to the medical world by Mr. Montgomerie, of Singapore, in 1822, who had his attention called to it by the natives using it for whips. Twenty years later, he recommended it as a good material for making braces and other surgical appliances. This is its first authenticated use in medicine or surgery. The Chinese and Malays are said to have long known and used it in medicine, though no authentic records of such use exist. It was in 1842 that Mr. Montgomerie, of the East India Company, recommended the use of Gutta-percha, for splints and other surgical appliances, to the medical board of Calcutta. In 1844 the Society of Arts of London gave him a gold medal in recognition of his useful discovery and its results in the practice of surgery. After the publication of Mr. Montgomerie's valuable paper on Gutta-percha, this article came rapidly into use for instruments and braces and other surgical appliances.

To come to the present use of these gums, we may refer first to general surgery. India-rubber has rendered its greatest service to surgery perhaps in the form of drainage-tubes. Upon the proper drainage of wounds depends in a large measure their healing. Without drainage of some sort, in fact, most wounds would not heal, while with drainage operations are now undertaken that otherwise would not be attempted. To illustrate in a practical but homely way the importance of drainage to the success of surgery, we may refer to the drainage of low or swampy lands. By means of drainage, the excess of water is removed from these swamps, and that land which before was filled with foul water, contaminated with miasmus, and without value and uninhabitable, is converted into a dry, healthy, and habitable area. So with surgery, where large abscesses are opened, suppurating cavities entered, or even where fresh wounds are made, drainage is absolutely necessary, if we are to expect success. As the drainage of swamp-lands makes them habitable and helps preserve the lives of those living in such districts, so the drainage of wounds or abscesses makes it possible now to save lives that would certainly be sacrificed were it not for drainage. In fact, new fields of surgery have opened up, simply from the fact that the wounds could be perfectly drained and cleaned properly.

While it is true that many substances, such as metal, glass, animal tissue, and vegetable tissue other than rubber, have been and are now used for drainage-tubes (some of them long before rubber was known), yet more drainage-tubes are made of rubber than of all the others combined. First, its great elasticity renders it applicable to almost any shaped wound; second, it is not easily broken; third, it resists most chemicals; fourth, it is cheap and easily sterilized. The amount of caoutchouc annually consumed in the manufacture of this tubing, and the commercial value of the same, it is impossible to state, but it is very large.

India-rubber and Gutta-percha are employed in many other ways in general surgery. As a tourniquet, rubber serves to check hemorrhage during an amputation. Elastic bandages and stockings are used in the treatment of ulcers and varicose veins. Ice-caps, ice-bags, coils, hot-water bottles, etc., made of rubber are very convenient for use when hot or cold applications are to be made. Rubber sheeting, rubber mattresses, rubber cushions, etc., are constantly used in surgical diseases. Irrigation-tubes, stomach-tubes, rectal-tubes, surgeon's aprons and cushions, gloves, etc., are all made of rubber. Syringes, instruments, instrument-handles, instrument-cases, etc., are in many instances made of hard rubber, while braces, splints, and other surgical appliances of this nature, are made of Gutta-percha.

In genito-urinary surgery, India-rubber, hard and soft, finds a large field of usefulness. Its chief use here is in the form of catheters, bougies, syringes, pessaries, cushions, bags, etc. Of the different articles here mentioned I shall confine my remarks, which are quoted in the main from a recent issue of a leading medical journal,* to two articles—catheters and bougies. Relatively the other articles are of almost equal value. Catheters, which are meant for emptying the urinary bladder, have been in use for thousands of years, certainly for two thousand, as those found at Pompeii bear witness. These, however, were metallic. Dr. Gouley, in the journal referred to, says that perhaps soft, pliable catheters were made as early as the eleventh century, but these did not come into general use until the

*"Notes on American Catheters and Bougies." By J. W. S. Gouley, M. D., *New York Medical Journal*, July 22, 1893.

latter part of the last century, and soft-rubber catheters not until some years later. I quote him:

Until recently France, Germany, and England seem to have supplied the greater part of the gum catheters and bougies used in different parts of the world. The first large manufactory of catheters in England was established many years ago by a German, Mr. Eschmann, whose successors are still engaged in the extensive manufacture of these instruments. About fifty years ago, says Mr. Stohlmann, soft catheters and bougies were manufactured in the United States by a Frenchman, Mr. Petrie, who had established himself in Philadelphia but soon gave up the business because the demand for his instruments was too limited, on account perhaps of their being inferior to those imported from France. From that time it does not appear that any attempt was made to manufacture gum catheters in this country until the year 1879, when Mr. Roy, son-in-law of Mr. Bénas, of Paris, established a catheter-factory in one of the suburbs of New York, and continued to supply, to a limited extent, the demand for gum catheters until 1890, when his establishment was closed. Thus far the home manufacture of these catheters had affected but little the importation of French, English, and German catheters.

It has not been possible to obtain strictly accurate information relating to the importation, home manufacture, and consumption of soft catheters and bougies, but some of the merchants and manufacturers assert that the annual sale is about one million soft catheters, *of which two hundred thousand are of India-rubber, and one hundred and ten thousand bougies.* Until the end of 1875 nearly all the soft vulcanized India-rubber catheters used in this country were imported. In 1876 the firm of George Tiemann & Co., of New York, began the manufacture of India-rubber catheters with countersunk blunt-edged eyes under the name of velvet-eyed catheters, and also some catheters of the same material with no lateral eye, but open at the vesical end. The following named firms have since been engaged in the manufacture of soft-rubber catheters: The Davidson Rubber Co.; Parker, Stearns, & Sutton; The Akron Rubber Co.; The Tyer Rubber Co.; and several other companies. At present, of the 200,000 India-rubber catheters sold annually in the United States, only 30,000 are imported.

As to quality of the home-manufactured catheters and bougies as compared with the foreign manufacture he says:

These American catheters and bougies are fully equal to those manufactured in foreign countries, and some of them are even superior. The American India-rubber catheters are superior to those of foreign importation in the construction of the eye, in the high polish of their surface, and in the smoothness of their interior.

In other special branches of surgery, as in the treatment of the eye, ear, nose, and throat, we have use for rubber, as syringes, atomizers, tubes, specula, bulbs, instrument-handles, etc. In gynecology and rectal diseases instruments and articles made of rubber are not only in wide demand but almost a necessity. These articles, among others, are catheters, bougies, syringes, tubes, cushions, basins, pessaries, bandages, bags, etc.

Finally, in that branch of mechanical surgery known as *prosthesis*, which has for its object the supplying of artificial limbs, etc., India-rubber serves a most useful purpose. Many artificial limbs are made entirely of rubber, while most if not all the remainder have rubber in some form,—as buffers, elastics, etc.,—employed in their manufacture. The artificial hands and feet made by A. A. Marks, of New York, who is one of the largest manufacturers of these goods in America, are of solid India-rubber, the feet having a small core of wood. Other manufacturers, of whom there are about thirty in the United States, do not make hands and feet of solid rubber, but employ the rubber in the joints as "buffers" to obviate jar or concussion, and in the sole of the foot also place the rubber for the same purpose. Elastics are sometimes placed about the joints of these artificial limbs to protect and strengthen them, and at the same time render them more mobile. So deftly are the artificial hands made that the wearer can pick up and handle small articles, and can even write, which to a business man, may mean his "bread and butter." For the laboring-man the hands are so made that they can be detached, and a hook, *e. g.*, the famous Capt. Cuttle's,—a knife, a fork, and even tools can be inserted into the arm attachment, and the individual thus enabled to earn his own bread. And so perfectly are the feet made and so comfortably and satisfactorily do they perform their function, that they defy detection in the wearer of them. Not only can the owner follow the ordinary vocations of life, but he can dance, ride the bicycle, etc., and not necessarily without grace and ease. Artificial limbs, unlike artificial eyes, which fill the place of the lost member in an esthetic sense only, actually perform the functions of the wanting members, and almost if not quite as perfectly.

Some idea of the enormous number of artificial limbs worn by the veterans of our late war can be obtained by remembering that it requires about thirty government manufacturers to supply the demand, as the government furnishes, to soldiers and sailors who lost limbs, a new support once in five years.

In medicine, generally and specially, the general practitioner has almost as many uses for India-rubber as the surgeon has. From the rubber sheets, which he uses to protect the bed at child-birth to the rubber cushions which he prescribes to ease the declining years of the aged, he has constant use for India-rubber in some form. Rubber nipples, which at first glance might be thought of but little importance, form a most convenient pap, *in this day of artificially-fed infants*, for the taking of artificial food, milk, etc. Especially is this so in the larger cities, where not only thousands of children in private homes are "brought up on the bottle," but where thousands of children in nurseries, foundling asylums, and hospitals are reared in the same way. The society woman has not the time (or inclination, perhaps) to nurse her infant, the working-woman, of necessity many times, *must* leave her infant at a day-side nursery, while many mothers on account of their own health are compelled to rear their children on the bottle. So that, from one reason or another, we find in New York city, perhaps, 25 per cent. of all the children born "bottle-fed." Teething rings made of India-rubber have their use a little later in the infant life.

Stomach-tubes of rubber are often used in the digestive troubles of children for washing out the stomach; as they also are for emptying the stomachs of adults. In the lying-in room, in private and hospital practice, besides rubber sheets we have use for catheters, syringes, dilators, irrigators, breast-pumps, belts, basins, etc., most of which articles are made of India-rubber and Gutta-percha. Again, in any condition in which heat or cold is to be applied, water-bags, caps, bottles, coils, etc., made of rubber are in general demand and use. In diseases where bed-sores are

to be prevented and where great ease and comfort are demanded, beds and cushions of rubber, filled with air or water, serve a most useful purpose.

The introduction of vulcanized rubber into the practice of dentistry marked the greatest epoch in its advancement. A word as to the history of this important branch of medicine may not be out of place here. That the Egyptians had professional dentists the artificial plates of ivory, wood, and even gold, found in the jaws of mummies, bear silent witness. After the Egyptians, however, there is no trace of dentistry until the time of Galen, and no traces of a special dental profession until the middle of the seventeenth century. Not until this century even was dentistry, as a distinct profession, recognized. With the advent of the process of vulcanization of India-rubber, about the middle of this century, the number of men in the dental profession rapidly increased. In 1820 the estimated number of dentists in the United States were 100; in 1890 they were estimated at 14,800!

Vulcanized India-rubber as a material for plates to hold artificial teeth has no superior, if, indeed, an equal. It is questionable if gold, which is much more costly, forms a more comfortable or even much more durable plate for artificial teeth. Dr. H. W. F. Cady, an eminent dentist of New York, informs the writer that a properly-vulcanized India rubber plate will last for a number of years—twenty to thirty—without being changed by the secretions of the mouth. Besides durability, it possesses another advantage over other material, in that during the process of vulcanization it can be tinted to exactly correspond to the color of the human gums. From an esthetic point of view, in both men and women, this is of much importance. Dr. Oliver Wendell Holmes, in an address delivered in 1872 at Harvard University, speaks pertinently on this point. As to a woman's teeth, he says:

> There is no element of her wondrous beauty which can take the place of white, even, well-shaped teeth. And as beauty is not a mere plaything, but a great force, like gravity or electricity, the art which keeps it, mends it, and, to some extent, makes it, is of corresponding importance.

Another recommendation yet in favor of vulcanized India-rubber for plates is its cheapness, which is not its least advantage; for thousands of people who now wear artificial teeth, which contribute to their good digestion, good health, and good looks, would be unable to do so were it not for vulcanized rubber, the price of which is within the reach of the masses. Gutta percha is sometimes used for plates in the same manner as India-rubber, but to a very limited extent, as it does not wear so well as the India-rubber article. Bleached Gutta-percha, however, is used in filling teeth, for which it is very useful when the teeth will not stand a metal filling. The "rubber dam" or sheeting is another article of India-rubber much used in the dental profession.

From a doctor's point of view, the teeth, upon which depend a proper mastication of food, and indirectly the digestion and assimilation of the same, hold the key, in great measure, to good health. Consequently, any art which aids in the preservation, care, and even restoration of them, is held in great respect. Pertinent here again is another remark from Dr. Holmes, who makes Walter Savage Landor say: "I have lost my mind, that I do not care so much about; but I have lost my teeth, and I cannot eat." Certainly a pathetic condition! Had he been supplied with a set of artificial teeth, such as are made to day, his mind would have been a greater loss to him, perhaps, than the loss of his original teeth. Without good teeth, however, there is no such thing as good health. Hence the inestimable service that vulcanized rubber has rendered to mankind already. And, if we are rapidly advancing to that "toothless and hairless age in man" so confidently predicted by some of the most advanced scientists of to-day, it stands to render us still greater service.

It is estimated that sixteen tons of India-rubber are annually consumed in the manufacture of plates for artificial teeth.

In the field of hygiene hard rubber is sometimes used in the manufacture of water-pipes, faucets, valves, etc., all of which articles have their use in sanitary plumbing.

Soft rubber has even a more extensive use in the manufacture of articles that are employed in the practice of hygiene, both public and private. Mackintoshes, gossamers, rubber shoes and boots, are the most important of these. These articles have to do chiefly with the prevention of disease, which, indeed, is the chief aim of hygiene. They also protect those recovering from disease. The importance of protecting the feet from the damp ground is tersely expressed in a text-book by Dr. Bosworth, a leading throat-specialist of New York, who says:

> The best chest-protector is worn on the sole of the foot. Furthermore, inasmuch as all these articles are for protection and prevention, they may very properly be regarded, so far as health is concerned, that "ounce of prevention" which is better than the pound of cure.

With reference to the use of India-rubber in the practice of army and navy hygiene, I shall content myself with the mention of one article, and that in relation to the army, though it applies with equal force as regards the navy. I quote from an article* by Dr. Alfred A. Woodhull, a surgeon in the United States army, who says:

> A poncho, or India-rubber blanket, which is not technically "clothing" but "equipage," may be issued in the field. This waterproof may completely protect the sleeper from soil-dampness, and is, perhaps, *the most important single article* for the soldier's use.†

So throughout the entire practice of medicine, dentistry, and hygiene—medicines excluded of course—with one exception (steel) India-rubber is, I believe, the most important single article used by the medical profession.

* "Reference Handbook of the Medical Sciences," Vol. VIII, p. 760.
† The italics are mine. A. E. D.

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BRAZILIAN exports to France last year showed a decline. The exports of India-rubber to that country, as officially reported in Brazil, amounted to 1,934,900 pounds, of the value of 4,644,000 francs.

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THE Boston *Globe* attempts to tell a correspondent how to make tan shoes waterproof. The best way is to coat them heavily with cement and store them in a safe. Nothing else is certain to prevent the inroads of water.—*Charlestown Enterprise.*

# RUBBER INSULATION FOR UNDERGROUND WIRES IN ENGLAND.

*Views of Manufacturers and Engineers.*

I—A DISCUSSION OF ELECTRIC-LIGHT MAINS.

THE proceedings of the Northern Society of Electrical Engineers of England, at a recent meeting, contain an interesting discussion on the present practice and past experience in regard to underground wires for electric lighting. Two papers were presented on the subject; one, by John H. Rider, entitled "Notes on Designing a System of Electric Light Mains," the other, by S. V. Clirehugh, on "Various Systems of Underground Mains and Methods of Laying Same." A joint discussion was held on the two papers in which every participant was either a manufacturer of electric wires or an engineer of experience in the construction and maintenance of systems of electrical distribution. These proceedings give an interesting view of underground wire practice in England and from them we have condensed the following account of the opinions expressed and of the facts presented.*

It would be well to preface the account of these papers by an outline of the conditions under which electric-lighting is carried on in England. In planning a central station there the designing of the "mains"—as they call the system of underground wires—is considered fully as much of an engineering work as the designing of the station itself, with its steam- and electric-plant and accessories. A definite area is assigned to each station and complete plans of the wires to be laid, together with rigid specifications governing every detail, are drawn up before any work is begun. To these plans and specifications the contractors bid, and to them the successful bidder is held in carrying out the work. The whole industry of electrical supply—*i. e.*, the supply of electricity—is hedged about by stringent regulations, administered not by ignorant politicians, but by the Board of Trade, which is assisted by experts of high standing. Consequently there is none of the haphazard, slipshod work that has been the curse of the electrical industries in the United States, and which, fortunately, is fast giving way to careful design and substantial engineering.

As an instance of the precautions observed in England in regulating the operations of electric-light companies, the following paragraph from Mr. Rider's paper is instructive:

> At whatever pressure we may generate our electricity we are compelled by law to deliver it to our customers at a low pressure. In the case of a general low-pressure system this is done by means of a distributing network fed at various points by feeder cables. When the generation is at high pressure we may use either a low-pressure distributing network, fed through transformers at various points, or we may place transformers on the consumer's premises and so have practically no low-pressure network at all. The Board of Trade, however, will now only give its sanction for this latter course on the distinct understanding that, when we are called upon to do so by them, we will lay down a low-pressure distributing-main and remove the house transformers. Therefore all arrangements using house transformers can only be looked upon as of a temporary nature.

Mr. Rider divides the many systems of laying mains that obtain in England,—where, it may be observed parenthetically, each company builds its own conduits if it requires them,—into two chief classes, "drawn in" and "built in." By "drawn in" are meant systems where pipes or conduits are used and the cables or wires can be drawn in and out at will, and by "built in" systems employing cables laid direct in the ground or laid in a trough which is afterwards filled in solid with bitumen. The chief advantages of a "drawn in" system are: (1) easy to inspect, (2) easy to add cables, and (3) easy to withdraw cables. The "built in" systems have the advantages of: (1) generally requiring less space, (2) being easier to lay, (3) no danger from gas or water, and (4) less prime cost. Their chief disadvantage lies in the necessity for opening the street to make additions or repairs.

The explosion trouble has also been experienced in England in connection with the conduits, and it is pointed out that thorough ventilation is the only cure. Buried systems are free from this trouble and also from the trouble and expense of providing service boxes or hand-holes at points where branches are taken from the distributing mains into customers' premises.

Mr. Rider deals at some length with the lack of attention to proper design of cables for alternate current-systems of distribution. To prevent waste of energy by the production of induced currents in neighboring conductors, or in the sheathing of the cables themselves, it is necessary to use concentric cables or an effective substitute therefor. Where alternate currents are distributed on the three-wire system a triple concentric cable—that is, a cable having one solid and two cylindrical conductors insulated from each other—is required. This type of cable offers the objection that joint-making becomes a difficult and delicate operation. As a substitute for such a cable, Messrs. Siemens Brothers & Co. have produced a type containing three separately-insulated conductors laid up into a cable which is then lead sheathed. The lay of the conductors causes them to have practically the same center and the inductive effects are therefore neutralized. We fancy that this type of cable has not yet been adopted in this country, where concentric cables are very little used.

In referring to tests for insulation resistance, it is very properly said that too much stress is laid on factory tests and not enough attention paid to tests after the cables are laid and jointed—when the insulation resistance is really wanted. Mr. Rider also urges that all cables should be tested for breaking down with a voltage at least twice as high as the ordinary working pressure—a precaution now very

* Those interested in obtaining the full report are referred to the London *Electrical Engineer* of March 16, March 23, and April 20, 1894, from which these notes are taken.—THE EDITOR.

generally adopted by cable-manufacturers. Mr. Clirehugh sums up the principal requisites in a system of mains somewhat in this way: economy in first cost; long life; facility for increasing the capacity of mains; accessibility for inspection, etc. He divides the systems available into three general classes: insulated cables in conduits; armored cables; and bare copper in culverts.

II—DIFFERENT TYPES OF INSULATED CABLES.

THE insulated cables may be divided into two classes—one in which the insulating material is moisture-proof, the other in which it is not. The substances used for the first class are India-rubber, Gutta-percha, and bittite; those for the second class, jute, hemp, cotton and paper impregnated with oil, wax, or bituminous or resinous compounds.

Gutta-percha Mr. Clirehugh discards from further consideration on account of its unsuitability for electric-lighting work. Vulcanized India-rubber, he considers, stands at the top of the list as an insulating material for electric-light cable. He lays stress, however, on the delicacy of the vulcanizing process and the consequent difficulty in obtaining good joints in vulcanized rubber cables. This is a very important point, and it is rather curious, in view of the emphasis laid on it by Mr. Clirehugh in his paper, that he should have withdrawn his remarks—evidently based on experience—under fire of exceptions taken to them in the subsequent discussion. He says that a good rough test on a vulcanized joint is to try to mark it, after it has cooled, with the thumb nail. If it is just right the rubber will yield but will retain no mark; if a dent remains the rubber is under-cured, and if the rubber is hard it is over-cured.

"Bittite" is the material manufactured by the Callender Co., which once had a factory in America, but closed it some six years ago. Bittite, it is believed, is bitumen refined to purity and vulcanized. The conductor is covered with a seamless coating of this material put on under pressure, then taped and served with a compound, taped again, braided with a hemp yarn, and passed through a bath of hot asphalt compound. Joints in bittite cables are insulated by wrapping the conductor with half-vulcanized bittite up to the diameter of the original insulation and then protecting it by a wrapping of compounded tapes. The joint is then heated with a lamp to make the wrappings solid and to complete vulcanization. This system of jointing is very simple and requires no particular training on the part of the workman. Bittite cables are used largely in England for low-tension work, but not up to the present, for high-tension work.

Mr. Clirehugh goes at some length into the manufacture of fibrous cables, which are used so extensively in the United States for telephone work, but have not yet been largely adopted for electric-lighting. The cheapness of this class of cable is a great recommendation, and Mr. Clirehugh holds that it will give results equally good with rubber if properly used. Difficulties have arisen with fibrous cables because uninstructed jointers have treated them as they have been accustomed to treat cables insulated with waterproof compounds, with the result, of course, that moisture got in and the insulation suffered.

A good practical point given is that excessively high insulation in fibrous cables is obtained at the expense of the life of the cable, as the prolonged drying-out at very high temperature acts unfavorably on the strength of the material. A uniform insulation resistance is to be desired, but an extremely high resistance is of doubtful value.

Paper insulation has the advantage of cleanliness in jointing. It is also excellent as regards resistance to disruptive discharges. A thickness of a quarter of an inch of paper insulation has not broken down under a pressure of 20,000 volts. The Ferranti concentric mains, which have been working for some years under a pressure of 10,000 volts, alternating, are insulated with paper impregnated with resinous compound.

A short description is given of the Crompton bare-wire system used for low-tension distribution. The culvert consists of a concrete trench with walls 6″ thick and bottom 4″ thick, laid under the sidewalk. The culvert is covered with York stone bedded in cement and is rendered inside with cement, so it is thoroughly waterproof. Boxes are placed every fifteen yards and in these boxes the insulators are fixed, the conductors being supported only at these points. The insulators are large porcelain affairs with a notch at the top to hold the conductor; the insulators are supported by oak cross-bars mounted on concrete about two inches off the bottom of the culvert. In the joint discussion on the two papers Mr. Wordingham, the first speaker, pointed out that the desideratum in cables was durability rather than initial high insulation resistance. He stated that the total insulation of the system of mains at Whitehaven, when laid, was 1870 megohms—an astonishingly high figure, even assuming the extent of the system (not stated) to be comparatively limited. But join on 1000 consumers and the leakage from interior wiring fittings, etc., will bring the total insulation of the system down to perhaps $\frac{1}{1000}$ of a megohm, and the advantage of very high insulation in the mains themselves becomes a mere phantom, so to speak. Therefore durability is more to be looked for than excessively high insulation. This is a very pertinent point, but at the same time it may be broadly stated that cables which show a high insulation are likely to be the most durable—always provided that the insulation is not much higher than the particular material used ought to give. Mr. Wordingham said that the bare-copper system was credited with a lower insulation than it really gave; that the actual results met with in practice were much better than those currently reported. At the same time he did not give any actual figures. He thought the difficulty of making good vulcanized joints had been exaggerated, that once the proper process had been determined for a given material the operation was sufficiently simple. The saving clause, we think, is good.

Mr. Mountain, of Hudderfield, agreed with Mr. Wordingham as to making joints. The difficulties are overcome with ordinary care. He believed in vulcanized cables in cast-iron pipes and thought that cables insulated with bitumen fiber and paper might be very good for low-tension mains, but were unsuitable for high-tension work, "unless laid with great care and at very considerable expense." One

can hardly imagine that Mr. Mountain would lay vulcanized cables for high-tension work carelessly or cheaply, so the exception quoted does not have any very weighty meaning.

Mr. Bourne, of London, mentioned paper cables with an insulating covering only .0175″ thick—composed of seven thicknesses of the very finest paper—which worked well at 2000 volts. He agreed that paper offered great resistance to disruptive discharges but knew nothing as to the durability of paper cables.

III—INDIA-RUBBER JOINTS FOR CABLES.

MR. JAMES TAYLOR joined in the chorus that rubber joints are easy to make. Such work was a simple matter but needed care. Regarding paper *versus* rubber, they had had ten years experience with rubber; in another seven or eight years they might know something about paper. Conservative, to say the least.

Mr. Connolly, an old hand at cable-manufacture, said they had certainly thirty years' experience with rubber, and he knew of cables now in successful use that were made more than twenty years ago. He thought the tendency was to abandon low-class insulators for the high class, meaning that it is safer to use rubber than paper. He made the familiar reference to the danger, with fibrous cables, of rupture of the lead, and wanted to know of any cheaper material than rubber that has the same qualities, —*i. e.*, waterproof, not liable to melt at high temperatures, and durable. To Mr. Connolly there is nothing like rubber, and as he makes cables, and doesn't use them, he ought to know.

Mr. Whiteley caustically observed that an intelligent workman could get into the way of making India-rubber joints after one or two trials, and very good ones, too.

This was too much for Mr. Clirehugh. To learn that "any intelligent workman" could make "very good" vulcanized joints after one or two trials was the last straw. So he stated to the meeting that he withdrew his remarks about making India-rubber joints.

We venture to think he was wrong in so doing. It is unquestionable that a good vulcanized joint—or for that matter a good joint in any kind of insulated wire—requires much skill and care and experience on the part of the jointer. To argue otherwise implies lack of ingenuousness or lack of experience on the part of the argufier.

Mr. Cowan said that the Brooks oil system, in which the whole system of wires has to be kept immersed in oil, was not so objectionable as it had been made out to be. He had known it to work well on a short line at 2000 volts. He added, however, that he did not lay it, but merely watched the work doing. Perhaps if he had laid it his opinion might have been different.

Mr. Bourne was of the opinion that a reasonably good cable designed for 100 volts will stand a pressure of 10,000 or even 20,000 volts. Consequently, in making tests of the breaking-down strength of a cable, it was not at all extravagant to make the trial with ten times the intended working pressure. As an instance, he had taken a short piece of wire from an installation at the Crystal Palace that was used on a 100-volt circuit. It took 62,000 volts to break down that piece of rubber. Which is very interesting, but fallacious, as a general guide because, although a short piece might stand such a strain, it would not be reasonable to apply such extremely severe tests to a long factory length of wire. A short disjointed argument then took place as to the time vulcanized rubber had been used as an insulator. It appeared that vulcanized rubber has a record of 30 years as an insulator, though for the greater proportion of this time telegraph-cables only could be meant. It was also said that other articles of vulcanized rubber had a history that dated back forty or fifty years. Therefore the durability of vulcanized rubber is to be regarded with respect.

A word was then said on the other side of the joint question. Mr. R. Taylor, who has had twenty-five years' experience with the famous firm of Henley's, said he had made vulcanized joints over twenty years ago and they were still working under the German ocean. That is, the cables in which the joints occur are still working. Mr. Taylor's experience was that, with care, there was no fear of vulcanized joints going wrong. But the greatest care was required *and* thoroughly-trained jointers. Jointers should be instructed by the manufacturers and properly trained by them.

Mr. Corlett gave some interesting figures regarding bare copper mains. In Brighton, England, where this system is used, the average insulation resistance in wet weather runs from .35 to .5 megohms per mile, and in dry weather from 2 to 3 megohms per mile. These results are extremely good—better, we fancy, than those obtained with overhead circuits in America constructed of the so-called "weatherproof" wire. The cost of maintenance of the bare-copper system of mains in Kensington representing a capital outlay of $280,000, had averaged during four years only .43 per cent.

IV—FIGURES SHOWING THE USE OF RUBBER.

MR. T. CALLENDER said that the papers and discussion had seemed to treat vulcanized rubber as the only material for mains, but when the details were looked into it was surprising to see how little rubber was really used. Out of 82 central stations in the United Kingdom, 39 have mains entirely insulated with materials other than rubber; 6 have bare-copper distributing-mains and bitumen-feeder cables; 7 have bare copper and rubber cables; 5 have part of the system of rubber cables and part of cables with other insulating materials; 19 are rubber insulated throughout, and 6 have a mixture of different cables, rubber, bitumen, and lead sheathed. Of 15 stations the mains were laid throughout by the Callender Co., in the majority of cases using vulcanized bitumen cables. In a number of provincial towns and in several London districts the Callender cables have been laid in conjunction with bare-copper systems. From this rough analysis of the actual work done Mr. Callender's inference is that rubber is certainly not the chief insulating material. Where rubber is in use it is chiefly for high-tension alternating-current work, and even here Mr. Callender thinks it will give way to lead-sheathed,—*i. e.*, fibrous insulated cables. With regard to bare strip the expense of putting down the bulky

culverts often offsets the natural economy of the system. Mr. E. H. Nisbett, of the company that lights the city of London, gave some examples showing that in certain cases armored cables come considerably cheaper than drawn in cables. He took exception to Mr. Clirehugh's statement that India-rubber-insulated cable "stands at the top of the list from a scientific point of view." What is the scientific point of view of a perfect cable? he asks. Is it great durability, great dielectric resistance to pressure, high insulation, easy jointing and cheapness? "If so, I do not think India-rubber does stand at the top." Fibrous insulated cable, lead-sheathed, is in some of these points ahead of rubber. Such cable has been used throughout in the lighting of the city of London. "Pinholes in the lead" are a bugbear. Defects in rubber are likely to occur during manufacture and to develop afterwards. Mr. Nisbett showed a sample of a rubber cable which had been working only two years. When it was laid down, in London, the rubber was apparently perfect. On a recent examination several lengths were found in which the rubber was very badly cracked and unfit for further use.

V—GOOD SERVICE OF VULCANIZED RUBBER.

MR. G. E. PREECE thought that in the lead-sheathed fibrous-insulated cables we had now arrived at a very high pitch of perfection. He thought, however, that the lead sheathing was not of sufficient durability and not so good as had been employed. He did not think that the lead-covered cable would eventually survive. Vulcanized, he thought, had given every proof of its adaptability to the work, its use is increasing and evidence of its durability accumulating. Mr. Preece showed two samples of vulcanized-rubber aërial cables that had been put up in 1873 and taken down in 1893, because the building to which they were attached had to be removed. The samples, after twenty years' exposure to London air, were in excellent condition. There are cases where vulcanized rubber has not done good service, but this has been due to the employment of an inferior quality. With regard to jointing, Mr. Preece said there was really no difficulty about it, "but for absolute perfection in a joint none but skilled workmen should be employed." That is just the point. Nobody wants anything *but* "absolute perfection" in a joint; hence the necessity for skilled jointers.

Mr. Rider, in reply to the discussion, said that one advantage of bare copper mains is that the insulator cannot be adulterated! The manufacturer cannot put in any oxid of zinc, size, or rubber-substitute. But with rubber cables you never know within 20 per cent. how much adulterant is present. Mr. Rider was sorry (this reviewer has already expressed his sorrow) that Mr. Clirehugh withdrew his remarks about vulcanized joints. There is undoubtedly great difficulty in securing a good joint by this method. In his experience it had been found impossible to make joints with the material supplied by the manufacturers. He mentioned several good points regarding paper cables. As regards flexibility he had bent a piece of concentric paper cable of $1\frac{1}{2}$ in diameter to a radius of 30 inches. After straightening it withstood a pressure of 4500 volts, though designed for only 200. Regarding the length of cable that could be drawn into a duct they had drawn in (in London) 555 feet in one length; the cable weighed two tons. (Size of cable and size of duct not stated.) He thought paper cables specially suitable for high-tension work; such cables now laying at Southport were tested at 20,000 volts without any breakdown—the insulation being only $\frac{3}{16}$ inches thick. The paper cables in London, designed to work at 2000 volts, are tested in place and after all joints are made at 10,000 volts.

Mr. Clirehugh dwelt on the divergence of opinion as to the difficulty of making good vulcanized joints; several had stated that the difficulties were overrated, but agreed that it was necessary to have jointers trained by the manufacturers. He knew that in London vulcanizers were paid 20 to 25 cents an hour (equal to about 40 cents to 50 cents here) and were in demand at that. Fibrous cables were specially adapted for high tension work. He had great faith in paper cables, but did not think they had yet taken the place of rubber.

## A BOLIVIAN GUARANTEE FOR INTERNAL IMPROVEMENTS.

*By William Nelson Black.*

ONE needs to be very cautious in making statements about some of the rubber-producing districts of South America. They are practically unexplored districts, where the boundary lines between the different republics are indeterminate or in dispute, and where even the rivers, those arteries of communication, must often be mapped along conjectural lines which may deviate many miles from the true lines.

Some rather imaginative writers, however, might not find in this lack of geographical knowledge, or in this political confusion, an admonition to caution. They might see rather an inspiration to romance, a chance to create an ideal world, and to people it with some such mystic conceptions as the ancients threw around the head-waters of the Nile, and the other outlying districts of their limited universe. They might even call the eastern slopes of the Bolivian Andes, for example, a nether world, and, if the genius of modern philosophy forbade their peopling them with the shades of Bolivar and the dead heroes of his liberating army, they could at least build financial palaces out of caoutchouc-trees and people them with live millionaires, in accordance with the conceptions of modern civilization.

But this would hardly be fair-play in dealing with persons concerned in the rubber industry—an enormous industry created out of nothing during the last fifty years

simply because it was a very substantial interest, and only needed to be prosecuted without any embellishment to be made successful. It will be best, therefore, to adhere to the original statement, and say that all facts bearing upon rubber production in South America should be stated with caution, and without forgetting that it is a continent on which the revolutionary disease has become chronic, and liable at any time to bring a bad quarter of an hour for any man concerned in the preservation of the public peace.

Looking at a map of Bolivia we find it to be a wholly inland country, beginning among the Andes mountains on the west side, and extending nearly 800 miles eastward to the Guaporé and Paraguay rivers, which, flowing, the first northwestward and the other southward, separate it from Brazil and Paraguay. From north to south, bounded by Peru and Chile, the territory extends about one thousand miles, until it finds a southern boundary on the Argentine Republic. This makes a vast expanse of territory covered at present by a population of only about 2,500,000, but fertile in natural resources and capable of contributing enormously to the raw material of rubber-manufactures.

The topography of Bolivia is peculiar. The Andes in their course southward split into two ranges, one following near the Pacific coast through Peru and Chile, and the other extending eastward far enough to enclose the magnificent highlands or basin that surrounds Lake Titicaca. This basin, known as the Altiplanicie, is several hundred miles in length, and from sixty to one hundred and fifty miles in width. It encloses Lake Titicaca, a body of water more than one hundred miles long by fifty wide, and elevated above the Pacific ocean, barely more than 150 miles away, nearly 2½ miles, or 12,488 feet. Its average depth, according to Professor Agassiz, is 600 feet. About two hundred miles to the southward of Lake Titicaca, in the same basin, and connected by a river now being dredged for the improvement of navigation, lies Lake Popoo, not quite half the size of Titicaca. These two lakes are by far the highest bodies of water in the world, and it is supposed that in a comparatively recent geological era they formed part of one immense inland sea to which present topographical formations must ascribe a length of 600 or 700 miles. Surrounding this wonderful basin, separated so far sometimes by the intervening plains that they would be invisible from each other, are some of the highest mountains in the world, forever snow-clad, and reducing the hot breath of the tropics before it reaches the basin to the temperature of New York or Paris.

This Altiplanicie, then, may be called the temperate zone of Bolivia. Indeed it is a peculiarity of the country —a peculiarity shared, however, by all tropical countries with high mountain ranges—that the temperature of all the zones on earth may be experienced at the cost of only a few hours' travel. But the peculiarity is exaggerated in Bolivia to a degree unparalleled elsewhere. Only a short distance above this expansive and temperate basin, large enough to be the seat of an empire, is the region of perpetual snow, and the line of division is the Bolivian arctic circle. But force the intervening passes, or follow the channel of some glacier until it debouches on the eastern slope of the Andes, and you find yourself overlooking a vast expanse of tropical vegetation, and may soon feel the sun of the equatorial regions beating mercilessly upon your head.

As the country to the eastward of the Andes is low and flat, and as it is irrigated by the melting snow and glaciers of the mountains, accumulating until they go down in avalanches into the torrid valleys, you would expect to find it a country of great rivers. In this expectation you would not be disappointed, for the surface is seamed with rivers and their innumerable branches. Possibly, between 2000 and 3000 miles of water-way are found in the two eastern provinces of Beni and Santa Cruz, all discharging into the Madeira river of Brazil, a stream which in turn discharges into the Amazon. Again, in the province of La Paz, we find many hundred miles of additional water-way discharging directly into the Amazon, and offering a direct means of communication with the Atlantic ocean.

It is not, however, the La Paz rivers with which this article is concerned. In the kaleidoscope of South American life they may turn out to be Peruvian and not Bolivian rivers; and it is not likely that the Bolivian government would see its way clear to the expenditure of much money on their improvement while awaiting the turn of the kaleidoscopic cylinder. But in the rivers of Beni and Santa Cruz there is a reasonably secure source of national wealth, and it is in this direction that the Bolivian government has cast its eye and projected an improvement for which it is prepared to stand sponsor.

Readers of THE INDIA RUBBER WORLD will hardly need to be told of the obstructions to navigation on the Madeira river. All the falls and rapids of that stream, extending at intervals along about 150 miles, have been repeatedly presented on these pages in maps, and even the partly-built railway through which it was expected to overcome some of the obstructions to commerce has been illustrated. Thus far, these obstructions have presented an insuperable barrier to the development of navigation in eastern Bolivia, and though all the banks of the streams are lined with rubber-trees, they are as useless for all the purposes of commerce, except in a few localities, as if they had never sprouted from the ground. It is doubtful, indeed if there is a single steamer worthy of the name in the departments of Beni and Santa Cruz, and most of the rubber exported seeks a market over the Andes, and around the southern extremity of the continent by the way of Cape Horn.

To overcome these obstructions in the way of its eastern departments, the government of Bolivia is now offering terms which may very well attract the attention of enterprising men. It offers to pay 6 per cent. interest on the capital needed for the construction of canals, and on $200,000 of the equipment. In addition to this subsidy, it offers to grant an exclusive monopoly on the navigation of the rivers for twenty-five years. A concession for most of the work in canal-building would of course have to be

obtained from Brazil, for the Madeira river runs for its entire length through Brazilian territory. But it is not probable that there would be any difficulty in obtaining this concession for a private company, however strongly the government of Brazil might object to the work were it undertaken directly by the government of Bolivia.

At first blush no man who knows the condition of the country which it is proposed to improve will think this offer very encouraging. The population is everywhere sparse, and most of the territory is an unbroken wilderness. But the quantity of rubber within reach is said to be almost illimitable, the ground is as favorable for the production of Peruvian bark as of rubber, and for a company organized not merely for transportation purposes, but for both transportation and production, the offer seems promising. There can be no question but that it is a good country for the production of rubber; and if the government of Bolivia will remove all the obstructions from the road to market it certainly looks as if a large company could go in there and operate profitably.

Most persons who know of the partly-finished railway along the banks of the Madeira river may be inclined to think that a canal, or a system of canals entailing the construction of one or more locks at each rapids or falls, would be too expensive, and that it would be better to finish the railway already begun and place the idea of a canal among the back-numbers of the brain. But as an independent operation neither the canals nor a railway can pay for many years to come, and when we reflect upon the vast system of inland navigation in Bolivia which it is desirable to prolong through a direct channel to the Amazon, the weight of argument seems to be on the side of the canal. Doubtless, the railway would serve; but it would compel a too frequent breaking of bulk in the work of transportation, and, unless either built or subsidized by the government, it could not for many years even pay operating expenses. Yet it could hardly be built by the government of Bolivia, for Brazil would not permit it; and it would certainly not be built by the government of Brazil for the benefit of Bolivia.

The idea of canals as proposed by the Bolivian government seems like a good one, provided the work is undertaken by men who do not propose to make of the improvement a main source of profit. In the course of time, doubtless, South America, like North America, will be covered by railways; but it cannot be expected that population will press very rapidly into the torrid zone, and for many years to come the people of all the South American republics, at least to the northward of the tropic of Capricorn, must find in their water-ways the chief means of transportation. The Amazon river seems like a special conception of Providence. This river, with its tributaries, almost bisects the continent of South America directly under the equator, and it has brought cultivation and built up cities or considerable towns where only wild animals and venomous reptiles would be found at large were it not for the seeming accident of its flow. Then it will be a wise undertaking, supplementary only to the work of Providence, when all the countries that control tributaries to the Amazon set themselves to overcoming any obstacles that interpose in the way of navigation. Bolivia is especially interested in obtaining a free channel for steamboats from the head waters of navigation on the Beni and Guaporé rivers to Pará. It is the misfortune of that country that it is one of the few independent countries of the world without a single seaport, and even were this not true the topography is such that it would be extraordinarily expensive to connect her most productive departments with the sea-coast by railways. The improvement of navigation then and the opening of a new road to market through the Amazon river should be thought of the first importance by her public and business men.

With regard to the ability of Bolivia to pay the interest on the money needed to make her navigable rivers everywhere accessible, it can only be said with certainty at this time that it raises a subject for speculation. It is a country of extraordinary natural resources; but thus far they are unavailable. George Earl Church, in commenting on what he witnessed in Bolivia in 1867, writes as follows:

> I found millions of sheep, llamas, and alpacas browsing upon the mountain-sides, and not a cargo of wool was exported; vast herds of cattle roamed the plains, and yet an ox-hide was worth scarcely more than a pound of leather in the European markets; hundreds of tons of the richest coffee in the world were rotting on the bushes, and only about ten tons per annum were sent abroad as a rare delicacy; abundant crops of sugar in the river districts were considered a misfortune by the planter because there was no market; the valleys of Cochabamba were rich in cereal wealth, unsaleable when the crop was too great for home consumption; not a valley or mountain-side but gave agricultural, medicinal, or other products such as commanded ready sale in any foreign market; sixty-five kinds of rare and beautiful cabinet-woods stood untouched by man in the great virgin forests of the north and east. The mountains were weighted down with silver, copper, tin, and other metals, and the people gazing upon a wealth sufficient to pay the national debts of the world, and yet unavailable for lack of a means of communication. There was abundant evidence that not a river that carried its waters from Bolivia to the Amazon but washed through auriferous deposits as rich as any in California or Australia, and for lack of power to take machinery to them they did not produce £60,000 per annum, where they ought to have produced millions.

Admitting that the author of this quotation may have been blessed with that large faith in things unseen which is probably characteristic of most explorers, Bolivia must still be very rich potentially. But hundreds of tons of coffee rotting on the bushes, and millions of unshorn fleeces on the sheep, will not help to pay the interest on bonds. Were there no dependence but potential resources the prospect would not be encouraging.

But the realized resources of Bolivia are also considerable. No country illustrates a statistical chaos so well as Bolivia, unless it may be some country that keeps no official records of any kind, and nearly everything known in relation to production and trade must be a result of investigation. By this method of computation the internal or domestic commerce of Bolivia, however, is estimated at $100,000,000 annually at this time, and the total foreign trade, exports and imports, at over $32,000,000. As to the value of the national wealth as a basis for taxation, it is probable that no estimate has ever been made. There must be some means for apportioning the tax levy, but if the total valuations have ever been published the figures are not accessible.

# THE GUARANTEEING QUESTION IN THE RUBBER INDUSTRY.

*By Victor Yarros.*

THERE is a quiet movement now on foot among certain prominent rubber-manufacturers to abolish, by concerted action, the practice of guaranteeing products in the fire-hose branch of the business. Signatures are being solicited for an agreement to that effect, and when all those who ought to be in the move have given their acquiescence, practical action will be taken. Leading rubber-men are hoping that the movement may succeed, but the writer, after a careful review of the situation, is constrained to express his fear that the time is not ripe for the success of such an undertaking.

A few years ago one of the leading rubber-manufacturers, whose name carries weight and authority in the trade, gave three months' time and labor to a similar movement. He aimed, it is true, at larger results; he sought to abolish the guaranteeing practice entirely, not stopping at fire-hose. He visited other cities than New York, after making a thorough canvass here, and secured a considerable number of signatures. But the movement ended in failure. In giving the results of that experiment to the writer, the manufacturer said that unanimity was absolutely necessary for the success of the scheme. So great is the rivalry, so keen the competition, in the rubber business, that, if a few manufacturers decline to sign and abide by the agreement, it is not possible for the rest, even if they are more powerful, to inaugurate the reform for themselves.

Certainly, the competition in the rubber business has not diminished in the last few years. On the contrary, it has gone on increasing until it is the sincere conviction of some of the best men in the trade that there is an overproduction of rubber goods of all kinds, a supply far exceeding the demand. If this is the case, it is hardly possible that an agreement to abolish guaranteeing can secure the approval of the entire trade. Perhaps it is this feeling which has led the restriction of the present attempt to fire-hose alone; but even this is probably destined to failure. One gentleman in the trade pointed out that the chief difficulty is not in the obtaining of signatures, but in sticking to the agreement. There is not a rubber-manufacturer who does not eagerly welcome the proposition theoretically, yet there is scant faith in the practicability of the scheme.

Lest those readers who are not manufacturers should suspect that the latter are attempting to take a step that will injure the consumers, it is well to give here a general statement of the problem as it is.

Few understand just what this guaranteeing practice means. It has gradually invaded the entire field, and only the oldest and strongest concerns are able to resist it, not entirely, but to a limited extent. The consumers, be they private manufacturers or government officials, have been educated to expect the promise to guarantee the quality of the goods,—hose, belting, etc.,—for a certain length of time, to be one of the conditions of the contract. Just what the promise means, few realize. They think the goods can be returned if they do not suit the buyer, and that's all. Now, here is where the evil, the abuse, comes in. So indefinite are the promises that friction and conflict between consumer and manufacturer are inevitable. The former expects too much and thinks himself deceived and ill-used if everything he chooses to return or to deduct for alleged failure of the promise or warranty is not cheerfully accepted by the manufacturer. Say a manufacturer orders belting of a certain grade, and wants it guaranteed for a certain time. The traveling agents and salesmen, eager to get the trade, promise almost everything, without inquiring into the conditions of the work, etc. The manufacturer cannot enter into elaborate correspondence on the subject. He fills the order. Often the belting is used under conditions where it cannot possibly do the work expected of it; a costlier grade might be needed for it. Yet the manufacturer is blamed for the unsatisfactory result, and his guarantee is held up to him. If he resists, the customer gets angry, and says he can find plenty of people who will promise him all he asks. He can, it is true, for there is a recklessness among agents that shrinks from nothing. The manufacturers wish to do justice to everybody concerned. It is necessary to determine what a fair and reasonable guaranty is, and to avoid impossible promises.

To illustrate the abuse a case may be cited which occurred some years ago and finally came up in a court of justice for settlement. A western firm of dealers bought some belting of a New York rubber-manufacturer. It was guaranteed to be free from mechanical imperfections and to last a certain time. The dealers sold the goods to somebody who used them on reaping-machines. As they were never intended for such use, they naturally did not prove satisfactory. The dealers, in sending a check for the order, deducted some two hundred dollars for the imperfections of the belting. The manufacturers declined to accept the check, there was a disagreement, and suit was brought in the city where the dealers did business. The case was tried before a jury, and the verdict was in favor of the manufacturers. The judge, in charging the jury, laid down these propositions: A manufacturer, even if he broadly guarantees his product, must be presumed to intend nothing more than to warrant satisfactory working under proper and usual conditions. He makes several kinds of belting, and he cannot and does not guarantee that the inferior and cheaper grade will do as good work as the superior grades. If the jobber is honestly misled by the indefinite nature of the guarantee to make unreasonable promises to his customers, he must suffer the consequences of his own ignorance of ordinary business principles. A man who goes into business thereby tacitly makes certain representations to the public. He is expected to understand his business. If he does not, he practises

fraud upon the public. The law cannot prevent him from going into business, but it can force him to pay the penalty of his ignorance. Here is a jobber who sold belting which no manufacturer would guarantee to do the work required on reapers ; it was guaranteed for the work which may be properly expected of it. The jobber must stand the loss, not the manufacturer.

The manufacturer who was the victorious party in this suit said to the writer that in every case a court of justice would refuse to enforce the indefinite claims of the dealers and consumers who choose to understand under the promise to guarantee what is inequitable and impossible of fulfillment. But no one desires to go to law about it. It is expensive and productive of bad feeling. Business-like people ought to put an end to this abuse of ridiculous promises, of which no other manufacturers are guilty. It is a common thing to guarantee hose for five or six years. Now, there is no reason for this. Nobody would ask it. It is simply the result of the great rivalry that prevails in the rubber trade.

Another illustration of the necessity of some understanding in the matter may be cited. A certain New York rubber-manufacturer sold some low-priced packing to a Maryland dealer who was a regular customer of his. *At the end of a year*, the dealer, in sending a check, deducted the sum of ten dollars for a quantity of packing which, he alleged, had become hard and unfit for use. Though the sum was small, the principle involved was important, and the manufacturer wrote to the dealer protesting against the deduction, as a whole year had elapsed from the time of the sale, and nothing was known of the conditions under which the packing had deteriorated. The dealer answered bluntly, referring to the guarantee and saying he did not propose to suffer the loss. The manufacturer thereupon demanded at least the return of the packing, saying that the dealer could not expect to keep it without paying for it. The packing was returned, and most of it was discovered to be entirely satisfactory, so that it could be sold in the manufacturer's retail store without injustice to consumers.

In telling this episode, the manufacturer pointed out that here the dealer proposed to be judge, jury, and executive officer. He did not consider it necessary to call in the other party at all. Now, in a contract, there are two parties, and neither of them is allowed to decide that the other is guilty of a breach. Yet under this guaranteeing abuse, dealers and consumers very frequently deduct sums for alleged imperfections and violations of the warranty without submitting the question to the manufacturer or to third parties. The more independent and powerful concerns resist these attempts, but the customers have so many agents and salesmen after them that they feel they have the power to dictate their own terms.

What the rubber-manufacturers want is a fair and reasonable agreement upon conditions satisfactory to both parties to the contract, the consumer, and the seller. It ought to be possible to accept certain rules and make them binding customs of the trade, to which consumers might be referred in case they want too much. Reckless guaranteeing by agents and salesmen ought to be discontinued. Responsible promises can be kept.

The present movement in favor of eliminating guaranteeing in the fire-hose business will serve to direct attention to the whole subject. It is proposed to give the buyers of fire-hose thirty days in which they can inspect, examine, and thoroughly test the hose. If they find nothing to object to in that space of time, the responsibility of the manufacturer is at an end. He can dismiss it from his mind, and not be haunted by fears of having trouble a year or more after the sale.

Those who are not intimately acquainted with the rubber trade have no idea of the amount of friction, bad feeling, and trouble resulting from this guaranteeing business, which is, in respect of scope, peculiar to rubber alone. The conservative concerns have done a good deal to check it, and there are still a good many brands of belting, for example, sold without any guarantee. But the stress of competition is rendering such resistance less and less effectual. Owing to the ignorance of the consumers, they will rather buy of a less responsible concern which is very free in promises than of a conservative concern whose product is known to be superior. The remedy, therefore, can only come from the manufacturer, and concerted action is essential.

## THE TORRES SYSTEM FOR PRESERVING THE MILK OF THE RUBBER-TREE.

*By Senhor José Maximo Torres de Frietas.*

IN giving publicity to the Torres system for the preservation of the milk of the *Hevea Brasiliensis* in its liquid state, I am aware that my process is not the only possible one. I am positive, however, that there is no process at present in existence that is as practical, or that can be as readily adopted, when once the rubber-gatherers and -planters understand its value. The best part of my life has been spent in the rubber trade on the Amazon, where I conceived the idea of bettering the difficult work of rubber-gathering. To this end I spent years in examining the juices of various plants and trees that grow in the rubber districts, paying particular attention to the palms. These juices I extracted, sometimes from the roots, but oftener from the fruits and the bark. It was by no means an easy task to find nature's preservative for rubber-sap, but I felt that I should ultimately succeed, and finally I did. A certain combination of simple juices proved to be just what I had been seeking. The next thing was to learn all of the after effects of the admixture. Gathering specimens of rubber-sap preserved by the compound, as well as smoked rubber that had been treated by my process, I went to France, and in the factory of Martiny & Co. goods were made of both which were most satisfactory. On my return to Brazil I applied for letters

patent, which were granted me without hesitation. A brief extract from them reads as follows:

MARSHAL MANOEL DEODORO DA FONSECA, Chief of the Temporary Government, makes known to all whom it may concern that, attending the request of José Maximo Torres de Frietas, Brazilian, a layman, residing in the city of Manáos, made by his procurador, Jules Geraud, agent for privileges, and after considering well all which he alleges in his petition, I believe him to be the first and only author of a process for preserving rubber in its liquid state according to his report, which is deposited in the archives of the republic. . . . . grants him the use and enjoyment of the benefits and advantages of it for the term of fifteen years from this date, October 24, 1890.

In addition to this the Peruvian government have granted me a like privilege.

The present system of gathering rubber, that of applying cups to the trees, needs no description, so well is it understood. Perhaps it is not well known, however, that the milk caught in these cups must be smoked at once, or it becomes a lower grade of rubber known as "sernamby." Further than this, all of the milk gathered on rainy days is of this same quality. When the rubber-cutters are working under the most favorable conditions they are able to cut but one hundred trees. This makes a walk of at least six miles. Then at night, when they come into camp with the day's gathering, they are forced to smoke it then and there, or have the whole of it reduced to a lower grade of gum. This smoking comes as so much overwork, and, as it is a nauseating task anyway, often causes severe illness. With the Torres system, however, the cutter is able to cut two hundred trees, and to put off the smoking for days or weeks if necessary, and then to do it all at once. Aside from this, there are certain rubber-manufacturers in Europe who for fine goods like to have the sap shipped to them unsmoked, and by the addition of the Torres liquid this can be most easily done.

Another point: All of the milk by my method is made into fine Pará, while by the present method much goes into medium and sernamby.

Still further: By making practically one grade of rubber instead of several, the prices will be far more steady, and values in rubber be better understood.

A point that the state should consider in the adoption of my system, is the fact that it should increase its revenues. Just as soon as the names medium and sernamby are replaced by fine on the tax-books, both taxpayer and government will be richer.

My process is far superior to the alum process, as it has none of the harshness of that ingredient, nor does it in any way injure the elasticity of the rubber.

European manufacturers were much pleased with the smoked rubber that was treated by my process, for the reason that the layers separated so readily, and the rubber was so strong. For balloon making it brought a higher price than any other. Certain English chemists examining it classed it not as fine, but as *superfine*.

It will be well, however, for rubber-gatherers to bear in mind the fact that they cannot use my mixture in the milk extracted from trees such as the Amapá, Sucuba, Surva, Tamanqueiro, Molango, etc., because such milk is full of rosin, and will coagulate anyway. The "sweet" milks can be collected by my process, but the bitter ones with rosin or alum properties will coagulate at once.

The directions for the use of the mixture, which follow, are so simple that any one can understand them. To each "bottle" of rubber-milk, add one decaliter (about two soup-spoonfuls). If the day be fine one spoonful will be enough to keep the milk from coagulating for twenty-four hours. A very little experience will teach one to add just the right quantity to secure the best results. If one wished to keep the milk, say six days, ½ quartilho of the mixture should be added to three bottles of milk. A general caution to all rubber-cutters may be timely. On rainy days use great care in treating the milk to expel the rain water, for if the milk becomes too hot, it makes the rubber brittle after smoking.

## A BRAZILIAN VIEW OF THE TORRES SYSTEM.

*By Senhor Antonio Bittencourt (Pará).*

THE honor of a discovery that bids fair to revolutionize the gathering of rubber in South America is due to our modest and indefatigable countryman, Mr. Torres de Frietas. I am told that he spent eighteen years experimenting with various agents to find one that would preserve the rubber sap in its liquid state.

On one occasion I went to visit my esteemed friend Mr. Laurence N. de Mello, at a place called Ayapuá. It was in the latter part of December. At the time of my visit a gentleman arrived from the river Purús, where he had gone to hunt up some explorers. This gentleman was Mr. Torres de Frietas. Mr. Mello and myself examined his patent, and convinced ourselves that we were not speaking with one of the many adventurers that overrun our district. Then Mr. Mello, investigator that he is known to be, begged the inventor by practical experiment to show the benefit of his process. He consented, and a few days thereafter we all went to Nova Trombetas, situated on the river Purús. Just beyond is a vast forest in which are rubber-trees, while here and there are a few houses. Mr. Mello ordered that a liter of milk be extracted and brought to him, catching the rain that was falling heavily at the time. In our presence Mr. Frietas dropped into the milk a dark yellowish liquid, the whole being then put away where it could not be tampered with. After a lapse of twenty-four hours the milk was just as liquid as when it was first taken from the pot. To this was added some new milk, and the whole was then smoked, producing rubber of the very best quality. Various rubber-cutters told us, at the beginning of our experiment, that the milk drawn while it was raining would not remain liquid, but would quickly coagulate, and be fit only for sernamby, and they were much surprised at the result obtained by us. The cutters told us that they always had to hasten the collection of the milk

and to smoke it at once, and that for this reason much was lost. A cutter with an equipment of this liquid could do double the work and be far less fatigued, in my judgment.

Mr. Frietas has an open account with the firm of Martiny & Co., in Paris, to whom he sells fine Pará rubber in its liquid state, as well as smoked. I learn that the milk brings a higher price in proportion than does even fine rubber. It seems to me that this discovery has in it such merit that, were it once brought to the attention of the public, it would at once be adopted. For that reason it should be widely advertised in Brazil, in the United States of America, and in Europe.

## PNEUMATIC TIRES AND RECLAIMED RUBBER.

THE reclaimed-rubber business has assumed such large proportions of late years that when a new article containing rubber as a constituent comes on the market it soon starts inquiry as to whether it can be reclaimed as old rubber boots and shoes as other rubber articles now are. Thus it is that considerable interest is evinced in the pneumatic bicycle-tire, which is beginning to come on the market, as those that were first used are now being discarded either to make way for newer tires or else because of its being worn out. The pneumatic bicycle-tire is but 3 years old, and has not as yet had sufficient time to become firmly established on the market, but considering the quality of rubber in them they should in time find quite a ready sale. These pneumatic tires contain a very fine quality of rubber, the better grades having a large percentage of the finest Pará rubber.

To get a high-grade pneumatic tire it is necessary to get a maximum of strength with a minimum of weight. Thus it is that for the past three years, or ever since the pneumatic tire was first introduced on the market, perfection has been sought in this respect.

This year's tire is indeed light in comparison with those made in the two preceding years. Those used on racers weigh but 1½ pounds apiece, and it is thought that this will be the standard weight of tires for such machines. The ordinary road machines have tires weighing from 3 to 4 pounds apiece. In the short space of 3 years, since the pneumatic tire was first introduced, almost 5000 patents have been taken out on this style tire, and though the best of these have been selected by the large manufacturers, the pneumatic-tire business has not as yet reached the stage of permanency and probably will not for another year at least.

With the increase in the number of bicycles and the greater appreciation of good riding, there is, of course, a more general demand for the best machines, and consequently the best tires. To day no stock is too good for the making of high-class tires. The cotton fabric which gives the tire its strength, with a minimum of weight, is made from a high-grade Sea Island cotton. The tube is lined with a sheeting of rubber, which makes it very nearly air-tight. The outer coat of rubber, made from the best Pará, makes the tire water-tight and gives it wearing qualities.

There are hardly any rubber goods made that contain proportionally a greater percentage of pure Pará gum than bicycle tires, yet there does not seem to be much call for them. A New York dealer some months ago made inquiries in this market for pneumatic tires but as there are not many to be had, and particularly at that time as there were very few on the market, no sales were made which would make a market price. Notwithstanding the good quality of the rubber in these tires they will not bring much of a price as scrap until there is a market for them as there is for old rubber boots and shoes. Even then they are not very likely to bring a high price.

We are led to believe this by the way rubber bands and rubber webbings sell. They contain the purest Pará rubber of any goods made and have an established market, notwithstanding which they will not bring over 6 cents per pound, against 4¼ cents the price which rubber boots and shoes bring, and the latter are a far inferior stock.

The increased manufacture of bicycle-tires will be of much greater benefit to the sellers of fine Pará than any one else. The business has already assumed those proportions where it consumes more Pará than any one thing outside of boots and shoes. It is estimated that the latter consume fully 75 per cent. of the total Pará sold, and bicycle-tires about 10 per cent. of it. If our pneumatic-tire manufacturers succeed in establishing a European market for their goods, as they hope to, one of the largest American concerns preparing to introduce their tires there this fall, then the consumption of Pará in this one line will be very large. It is thought now that the agents sent from this side will be successful, inasmuch as our manufacturers are far in advance of those in Europe in making bicycle-tires, as in almost all other kinds of goods of which rubber forms a component and important part.—*Boston Commercial Bulletin.*

## DATE-MARKS ON MECHANICAL GOODS.

THE idea of having a date-mark on mechanical rubber goods is not new, its first adoption dating back to 1892. but the passage of time has demonstrated its practical value, and it is being more and more generally introduced. It is obvious that when a rubber-manufacturer ships some goods to a jobber who may not sell it immediately, but keep it in stock months and perhaps a year or two, it is to the interest of the manufacturer to know, if any complaint reaches him through the jobber or through the consumer with regard to the quality of the goods, just when the goods were manufactured, and how long a period elapsed before they were brought into use. Again, even if the sale is direct to the consumer, it is useful to be able to verify the grounds of any complaints he might make by reference to the date of manufacture. In the nature of things, the goods of last year's manufacture cannot give as full satisfaction as those of the current year, but jobbers and dealers, when they find that they bought more than they can dispose of one season, might try to sell the goods as new next season. In the long run, this policy does not pay, but in business people are apt to seek immediate advantage without due regard to remote results. The rubber-manufacturer's interest is opposed to such a practice. As a matter of self-protection, the marking of the goods so as to show the year and the month of their manufacture was introduced.

Most of the large rubber-manufacturers mark their mechanical goods. Chiefly, however, belting, and hose of all kinds are marked. Packing, valves, and other goods are not quite so extensively marked. The marks are not usually intelligible to the

uninitiated, but there is no objection on the part of the manufacturers to the marks being known to dealers and consumers. In some grades of belting and hose, not only the year, but the month, is marked, one figure representing the year and another the months.

These marks are not to be confounded with the ordinary labels serving the purpose of advertising, or with the marks indicating quality. Nor are they to be confounded with the marks by which each manufacturer recognizes his own product. This system of marking is a secret of the trade. The date-marks, as the name indicates, are simply used for protection against unreasonable claims, especially in connection with the great problem of guaranteeing.

A prominent rubber-manufacturer was asked whether the dealers are unfriendly to this date-mark device. He answered in substance as follows: "As a rule, the dealers and jobbers are experienced men who know exactly how much to buy and who have little left on their hands at the end of the season. They realize that it will not do to sell old goods for new, and do not attempt to impose on their customers. It is true that there may have been some abuse, but the principal reason for the introduction of the date-marks is found in the practice of guaranteeing goods. When you guarantee your hose or belting for a certain period, you want to know approximately when the goods are put to the test of actual use. If you guarantee for a year, it does not mean a year from the time the goods are pressed into service, irrespective of how long they were kept in stock before such service. A manufacturer, we will suppose, writes you a note expressing displeasure at the packing which, he says, failed to give satisfaction. He wishes to return some and deduct from his bill. The date-mark shows you whether you are responsible for the alleged imperfection or not."

## IS THIS THE CARRIAGE OF THE FUTURE?

THE accompanying illustration, reproduced from *English Cycling*, shows the new electric pneumatic road-car, which has recently been turned out of a Coventry (England) factory. The inventors are Messrs. Bloomfield and Garrard, who are well known in the bicycle trade. The motive power is electricity, and the pneumatic principle and other bicycling inventions have been incorporated in its building. The framework of the carriage is built throughout of weldless steel tubing. The two front wheels are steered by means of a long ball socket head, actuated by a wheel and tangent

screw. The 24-inch wheels are shod with 4-inch pneumatics, and all working parts run upon ball bearings. The electromotive force is contained in a series of twenty-four accumulator cells, which are fitted quite out of sight in boxes arranged beneath the seats. The whole carriage weights about 1000 pounds. The machine is calculated to run at a speed of 3 1-2 to 13 1-2 miles per hour, according to the condition of the road and the wish of the occupants. It has been tried upon the roads and, it is claimed, fulfils the anticipation of the inventors.

## RUBBER-STAMP NOTES.

THE second annual meeting of the National Stamp and Stencil Trade Association is to be held in New York city on September 11-13. As a considerable proportion of the stamp manufacturers and dealers of the country live within a convenient distance of New York, a general attendance is expected. The secretary, F. E. Scotford, No. 304 Dearborn street, Chicago, would like to hear in advance from every member of the association who intends being present.

* * *

THE latest addition to our exchange list is a modest but well-appearing little monthly from Chicago—*The Commercial Stamp Trade Journal*—devoted to the interest of the stencil, steel, and rubber stamp trade. It is edited by Mr. Scotford, secretary of the stamp-men's association, and is announced as officially representing that organization. A list of members printed in the *Journal* shows that they now number eighty-two. By the way, the numerous advertisements in this paper indicate that the rubber-stamp business is in greater volume than is generally known outside the trade.

* * *

MENTION is made in the same paper of the Eastern Stamp and Stencil Trade Association, recently organized in New York, not "to overshadow the parent organization," but for the special convenience and needs of the members of the trade living in this section of the country.

* * *

THE following extract from the constitution of the national association suggests a business feature of the organization that is of interest:

ARTICLE II—Goods manufactured by members of this association shall be given the preference over goods of other makes, and only members shall receive association rates from manufacturers and jobbers.

* * *

IT seems that there are no rubber-stamp makers in Central America, but E. P. Pellett is engaged in the business at Barranquilla, Colombia, and F. E. Amsterdam at Demerara, British Guiana.

* * *

THE United States patents on rubber hand-stamps are beginning to expire. Two which expired recently are No. 191,265, issued to E. L. Tarbox, of New York, and No. 191,623, issued to L. Tilton, of Brooklyn.

* * *

IN 1862 it is said that a book, name not given, was printed from vulcanized rubber stamps.

# BRIEF ABSTRACTS OF RECENT RUBBER PATENTS.

AMONG recent patents issued by the UnitedStates Patent Office, embodying applications of India-rubber or Guttapercha to a greater or less extent, have been the following. It is not practicable here to do more than to note the use of rubber in each case, with sufficient detail to enable those who are interested to decide whether or not to look into any particular patent more fully:

*TIRES.*

No. 521,740.—Pneumatic Tire. Pardon W. Tillinghast and Frank Mallalieu, Providence, R. I.

A pneumatic tire consisting of an air-tube and an outer covering, separably vulcanized together so that they are attached one to another to prevent creeping or shifting, while the air-tube can be separated from the covering at any desired point, and a narrow strip of fabric coated with soap-stone and interposed between the air-tube and the outer covering along the inner circumference of the air-tube.

No. 521,805.—Fabric for Bicycle-Tires. George C. Moore, Easthampton, Mass.

A doubled curved seamless tubular fabric, for use in pneumatic bicycle-tires, having longest warps at two longitudinal portions and shortest and very heavy warps at two other longitudinal portions midway between the first named portions, with gradual diminution in the lengths of the warps from the longest to the shortest thereof, so that when the fabric is folded along the line of its shortest warps and then folded or curved over along the line of its longest warps it will form a double curved tube open along its inner side, with edges which are enlarged transversely by the heavy warps.

No. 522,141.—Tire for Bicycles. Eden M. Ballantine, Philadelphia, Pa.

In a bicycle, the combination with a wheel having a slot in its felly, of a tire composed of a helix of spring wire provided with two sets of loops, a draw-band passing through each set of loops, a turn-buckle for each draw-band, into which the draw-bands are threaded, each turn-buckle being slotted, a key passing through both slots in the turn-buckles and in the felly a colter passing through the end of the key inside the felly of the wheel.

No. 521,482.—Pneumatic Tire and Rim for Wheels. James W. Smallman, London, England.

A pneumatic tire and rim comprising a cover, a fastening ring attached to one of the edges of the cover and made from a single length of material the ends whereof are brought close together but left unjoined, an air-tube lying within the cover, a turned over edge of the rim, a groove beneath the turned over edge, and a piece of metal secured in a slot at the side of the rim so as to occupy the space between the unjoined ends of the fastening ring, the fastening ring being prevented from expanding or creeping by moving it under the turned over edge.

No. 522,090.—Wheel for Bicycles. George W. Smiley and Forest W. Dunlap, London, England; said Dunlap assignor to said Smiley.

A wheel of the bicycle type having an annular tubular inflated cushion supported by or around the hub and between the oppositely-splayed tensional spokes, ribs on the external surface of the cushion, shoes embracing such surface between the ribs, thrust spokes connected to the shoes and sliding freely through but guided by the wheel-rim, segments (or a continuous rim) attached to the thrust spokes, and a hollow rubber tire encircling and attached to such movable segments or rim and connected to the wheel-rim so as to permit of free play and cause the radial thrust to be transmitted directly to the cushion independently of the wheel-rim.

No. 522,138.—Rubber Tire. Charles K. Welch, London, England.

The combination with a grooved rim, of an inflatable tube, an outer jacket having wires or reinforced portions lying outside the groove along the edges of the same and being united with the tube.

No. 522,663.—Pneumatic Tire. William P. Jaus, Indianapolis, Ind., assignor of one-half to Carl H. Schuller, same place.

In a pneumatic tire, the combination with the air-tube, of a steel-armor plate bent in the form of a ring disposed on the outside of the air tube and entirely surrounding it, the two ends of the plate overlapping each other, each end being provided with transverse slots, and an extensible protecting strip secured to the ends of the plate by having its ends woven through the slots.

No. 522,689.—Pneumatic Tire for Bicycles. John Mariani, Boston, Mass.

A reticulated sheath, an air-tube, and an intermediate cushioning strip, the sheath having an exterior projecting rib composed of strands.

No. 522,814.—Pneumatic Tire. Charles K. Welch, Coventry, England, assignor to the Pneumatic Tyre Co., Limited, Dublin, Ireland.

In a pneumatic tire, the combination with the air-tube, of an arched jacket vulcanized thereto and consisting of two layers of thread extending transversely across the tire, the threads in one layer being at an angle with the threads in the other layer, longitudinal threads at the tread portion and near the edges of the jacket interwoven with the transverse threads, a layer of India-rubber interposed between the two layers of transverse threads and solutioned thereto, and inextensible cores contained in the loops formed at the edges of the jacket for holding the tire to the rim.

*DRUGGISTS' SUNDRIES.*

No. 521,473.—Bottle-Stopper. Gilbert L. Mathews, Newton, N. J.

A bottle-stopper, comprising a rod having a lower perpendicular portion and an upper looped end, a flexible valve having a central opening, the upper and lower washers having a connecting shank fitted on the perpendicular portion of the rod and passed through the central opening of the flexible valve, the disk connected to the lower end of the rod and having an upper concaved face and its edges overlapping and inclosing the edges of the lower washer, and the rod having a loop secured at its lower end to the upper washer.

*DENTAL AND STAMP RUBBER.*

No. 521,930.—Dental Plate. Thomas H. Graham, Toronto, Canada.

A dental upper set having a plate of flexible rubber attached as an integral part thereof and its margin within the air or vacuum chamber, and having a hole through the center of the flexible plate to communicate with the free and unattached central portion thereof beneath.

No. 522,467.—Rubber Stamp. Robert S. Hall, New York city.

In a rubber hand-stamp, the flexible rubber backing of cellular structure having its walls connected at all points of intersection and juncture with the outer margin, the walls and the outer marginal wall being provided with transverse perforations, whereby a lighter and more elastic backing is afforded.

*SADDLERY GOODS.*

No. 521,609.—Horseshoe-Pad. Albert L. Grant, Philadelphia, Pa.

The pad formed from rubber and having the beveled

marginal flange and the metallic plates embedded in the rubber and carrying projected calks or points, the plates being separated from each other and arranged one on each side of the longitudinal center of the pad throughout its length and close to the margin of the body, in combination with a shoe having its upper face shaped to retain and support the pad.

No. 522,789.—Elastic-Tread Horseshoe. Hiram H. Gibbs, Indianapolis, Indiana.

A horseshoe consisting of a metal frame provided with a series from one end to the other of long beveled sided slots through it and separated by narrow partitions, and recesses on the upper surface of the frame near the edges, and a resilient material so secured to the frame as to extend through such slots and bear on the ground when in use and to form a cushion above such frame.

*MECHANICAL GOODS.*

No. 521,796.—Hose-Reel. James B. Hunter, Cato, N. Y.

In a hose-reel, the combination with the main pipe, brackets journaled thereon, cross-pieces connecting their extremities, springs upon the cross-pieces, curved arms transverse to the free ends of the springs, and cross-bars connecting the ends of the arms, in combination with a spring pawl mounted upon the bracket, and a valve in the pipe adapted to be operated by the pawl when the reel is rotated.

No. 521,864.—Hose-Cart. Ephraim Shay and Lette Shay, Harbor Springs, Mich.

In a hose-cart, the wheels, the curved axle, the body suspended at the sides from the curved axle, braces connecting the body to the axle, and a partition composed of vertical rods connected to a bow-piece, which piece is attached to the front of the body and to the axle.

No. 522,459.—Packing. William J. Ellis, Philadelphia, Pa.

A packing for use in glands or packing-boxes of pistons, comprising in its construction an outer covering of lead pipe, having openings on opposite sides; a core composed of an elastic material; and a spiral composed of an admixture of lead combined with an alloy, wound around the core, the spiral being dipped in a rubber cement or solution, and being covered by plumbago or graphite, the core and spiral being adapted to be inserted in the lead pipe.

*MISCELLANEOUS.*

No. 522,745.—Insulating Composition. James L. Truslow, Jr., Summit, N. J., assignor to Truslow & Co., New York city.

A composite mass for insulating and non-conducting purposes, the same consisting of ground cork and infusorial earth, and a binder of rosin.

No. 522,469.—Blackboard-Eraser. Jasper D. Kious, Momence, Ill., assignor by direct and mesne assignments to Ludentia Throop, same place.

An eraser comprising a body having the longitudinal chalk-receiving chamber, and a rubbing surface composed of felt and leather or rubber strips arranged parallel to each other, the leather or rubber strips projecting slightly beyond the edges of the felt strips.

No. 522,910.—Bouquet-Holder. Abbie L. Marston, Bedford, La.

The combination of a suitable holder or receptacle provided with an external screw-thread on its upper end, a rubber tube or collar formed with lips and having its walls thicker at the top than at the bottom and which fits into the upper end of receptacle or holder, and a cap formed with a tapered upper end and an inwardly-extending flange on the tapered end, fitting over the upper end of the rubber tube or collar and on the receptacle.

*DESIGN PATENT.*

No. 23,411.—Eraser. Lothar W. Faber, Port Richmond, N. Y.

## INDIA-RUBBER SCRAP.

AT a recent meeting of the Merchants' Club of Boston, Mr. George A. Alden, so well-known in the rubber trade, read a paper on the India-rubber industry which was full of interesting facts. Speaking of adulteration of the crude rubber practiced by the gatherers in many countries, he said that his firm lately received from a manufacturer by express, a hat, boots, and overalls, which, he wrote, he had found in a ball of rubber, and he expected to find the man before he got through with the lot.

* * *

IN the manufacture of rubber goods in the United States according to Mr. Alden, more than 30,000,000 pounds of metallic oxids and carbonates are used. In addition, large quantities of earthy materials are used, principally to make weight. Cotton and woolen cloths are consumed to the extent of 20,000,000 pounds. Devulcanized or reclaimed rubber amounting to 25,000,000 pounds is also used. This includes almost all the cast-off rubbers, for these old goods eventually find their way back to the mills to be ground up and made into shoes again. This old rubber is worth from 8 cents to 30 cents per pound, according to quality. Without this old stock to draw upon, rubber goods would be a great deal more expensive to the consumer. The capital invested in rubber mills in the United States exceeds $25,000,000, employing a large number of people, men, women, and girls. The value of rubber thread, toys, etc., made amounts to $5,000,000; clothing $5,000,000; mechanical goods, $15,000,000; and boots and shoes, $28,000,000. The number of boots and shoes made daily for nine months in the year will foot up to 150,000 pairs.

* * *

MR. JOSEPH W. FRANKEL, one of the managers of a theater in Brooklyn, N. Y., is agitating the subject of equipping fire-engines with pneumatic tires. They would run easier, he says, there would be less weight for the horses to pull, and, consequently, they would run faster. What is better than all, however, they would not then fill the streets with noise. A member of the city fire-department said: "And if one of the tires became punctured—a possibility, you will allow—that engine might be too late at the fire to be of much use."

THE NEW FOLDING RUBBER BATH.

WIFE—It's all very well, but how are you going to empty it?

HUSBAND—Wait till I am through and I will show you that all it needs is a little intelligence.—*Texas Siftings Library.*

## NEW GOODS AND SPECIALTIES.

IT is foolishness to get drowned in bathing. Without any interference with enjoyment, a bather may make himself as safe in the water as on land. Observe the picture presented herewith. It is a fair illustration of the positions in the water which the bather may assume and maintain without exertion when provided with a proper kind of bathing-suit.

The bathing-suit, known as the Neptune life-suit, represents one of the happiest of the many happy ideas that have assumed form in rubber. It is a thoroughly scientific idea. Experienced swimmers, with sufficient adipose tissue to cover their bones neatly, know that when the lungs are filled with air the body can float on the water without effort; not very high out of the water, it is true, but high enough to avoid strangling. Then if one inhalation of the lungs will make the body sufficiently buoyant to float, what might not the equivalent of two or three inhalations do when an artificial storage reservoir is provided? This was the idea that inspired the inventor of the Neptune bathing-suit and it was a very solid idea.

As to the bathing-suit itself, it is simply a garment in two

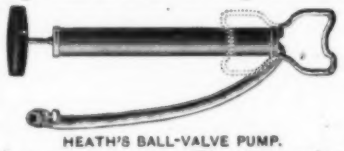
parts, manufactured from English zephyr wool, in a fashion to fit the limbs perfectly, and if the bather does not wish to be protected against the chances of drowning there is nothing in the external appearance of the suit to indicate that it is other than an ordinary suit of the finer quality. But invisibly enclosed within the waist there is a rubber belt which surrounds the body just under the armpits, and this belt, by means of a rubber tube, also invisible but conveniently placed for use, may be inflated in a few moments sufficiently to make the bather practically unsinkable.

But perhaps the bather will not wish to be made so buoyant. He may wish to dive; but if so he may expel the air at any time and fill again when he has had enough of this diversion. The advantages are right here. The hardiest swimmer in deep water knows that the necessity for constant exertion to keep afloat becomes exceedingly irksome, and he always wants to remain near some solid object which he may cling to for rest. But this bathing suit will enable him to rest anywhere, and without any of the disagreeable sensations experienced by contact with a raft, or pier, or solid body of any kind when in deep water.

This seems to be the perfection of a device for deep-water or surf bathing. With the best quality of an outfit any serious accident seems almost impossible. But its highest recommendation after all for any ordinary occasion will be found in its power of contributing to the bather's enjoyment. Made by the Crescent Manufacturing Co., No. 100 Wooster street, New York.

### HEATH'S BALL-VALVE PUMP.

THE little pumps for inflating pneumatic tires that ordinarily go with the machine are unsatisfactory, for the reason that they are not powerful enough and it takes too long to inflate the tire. To overcome this foot-pumps have been brought out, and while they are usually too large to carry when one is riding, they work well for tire-inflation before one starts out. The illustration herewith shows the Heath pump with patent universal coupling. The advantage of this coupling is that it will fit any style of valve, and there is no necessity for a great variety of nipples before one can inflate the tire. It is called "the best and strongest pump in the world," and is manufactured by the S. F. Heath Cycle Co., Minneapolis, Minn.



HEATH'S BALL-VALVE PUMP.

### PUNCTURE-PROOF BANDS.

THE Puncture-Proof Pneumatic Tire Co., Limited, of London, England, have patented a puncture-proof band which they are manufacturing and selling. The Chinnock Pneumatic Tire Co., Nos. 9-11 West Broadway, New York. have been appointed their sole agents for America and Canada. The band is claimed to prevent puncture absolutely, without in any way affecting the resilience of the tire. The bands are waterproof and last a long time, and weigh but three and a half ounces each. The band is placed between the inner tube and the shoe. To fit it to a detachable tire, the cover is to be removed, and the exact length of the band required ascertained. Should the band exceed the measurement of the inner circumference of the cover, the rubber casing should be drawn back and the surplus length cut off. Then the two ends should be thinned and overlapped for about two inches, and the rubber casing drawn over the lap, forming an endless band. To fit the band to the cover, rubber cement is placed on the inside of the tire-cover and on one side of the band; it is then allowed to dry, and the band is placed fairly in the center of the cover. The band is also placed on the tire by removing one side of the

cover from the rim and putting it evenly between the cover and the air-tube. In tires cemented to the rim, the air-tube is taken out, the end of the band and the air-tube fastened to a cord, and both are pulled back into the outer cover together. So sure are the manufacturers and agents of the unpunctureableness of the bands, that they are prepared to guarantee it and refund the money if any fault is discovered. The bands sell at $5 per pair, and are obtained from all cycle-dealers, the Chinnock Tire Co. having complete control of the market in America and Canada.

## THE WOONSOCKET GIANT COMBINATION.

THE accompanying cut shows the latest new feature in rubber foot-wear, placed on the market by the Woonsocket Rubber Co., of Providence, R. I. It is aptly named the "Giant Combination." While ostensibly designed for the great lumber countries of the northwest, its economy in price, durability in wear, and excellence in fit have given it a surprising sale in the east, which, combined with its popularity in the western country, has resulted in a demand that proves the "Giant Combination" to be one of the most successful ventures of this company. The felt boot used is among the best in the market. The over is on the style of what is generally known as the "Perfection" ankle-boot. It is constructed with special reference to this particular wool boot, and its sale is restricted to the combination. This combination can be obtained only in the first-quality Woonsocket brand.

## PATENT BOTTLE-CAP.

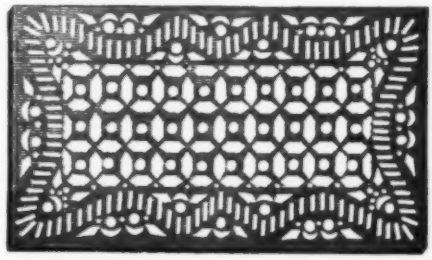
ONE of the most simple yet remarkable and useful inventions has recently been patented by the Birnbaum Rubber Co. (New York.) It consists of a bottle-cap made of pure rubber, and is intended for chemists, druggists, travelers, and, in fact, everybody having bottles requiring protection from dust and evaporation. The cap is put over the cork, and it firmly encircles the neck of the bottle. It is absolutely air-tight, thus preventing evaporation. It does away with the nuisance of dust gathering around the cork,—something which all who have chemicals standing on shelves will appreciate. To detach the cap the rim is pushed upwards with the thumb, and it slips off with ease. To avoid all trouble, the cap is attached to the neck of the bottle, when taken off, by means of a rubber ring, fastened to the cap by a neat string. The ring can also be used to prevent the cap from coming off and hold it in place more tightly. The article is patented in America and Europe, and will indeed fill a long-felt want. It is curious that such a simple device has not been thought of before.

## AN ADJUSTABLE RUBBER APRON.

RUBBER-MEN and saddlery-hardware men, who sell carriage aprons, are often heard to complain because they have to carry a full stock of sizes though but a few of them are ever called for. The result is that this often means a dead stock, and quite likely eats up the profit that should pertain to the goods that are salable. They have, however, a remedy for this state of affairs, and, as the article is not by any means new, one that has without doubt some time been brought to their attention. This is nothing else than an apron that is adjustable, so that it will fit any dasher, and still be as neat and compact, and furthermore as effective, as one made for the vehicles. This adjustment is accomplished by means of two springs that fit over the dasher, and hold the apron firmly in place. Thus any dealer by carrying one size may suit all comers, and not be burdened by dead stock. Manufactured by the Fairfield Rubber Co., Fairfield, Conn.

## NEW PATTERNS IN MATS.

A VERY neat and compact booklet is an 1894 Mat catalogue just received. It is devoted chiefly to perforated mats, of which there are illustrations of forty-three different patterns. The cuts that accompany this notice show two of the favorite designs. In addition to those shown in the catalogue, the company have hundreds of patterns as they remark in their preface, and can suit almost any customer. Many of the perforated mats are adorned with names, in one or two cases showing an enlarged *fac simile* of a signature. The pamphlet also contains pictures of diamond, vestibule, cuspidore and pitcher mats, stair treads, different tyles of corrugated mattings, etc., An excellent feature is the diagram that shows how to measure for perforated mats. The booklet is published by the Boston Woven Hose and Rubber Co., Boston.



## NEW MACKINTOSH BOX-COAT.

DEALERS are beginning to realize that there will be a large demand the coming season for mackintosh box-coats and that many will be worn in place of overcoats. As these coats are worn without capes it is very important that they fit well. All mackintoshes should be vulcanized after being made up so that the seams will be durable and all manufacturers know the difficulty in turning out a perfect fitting coat so made, because of its liability to stretch while on the form in the heater. The American Rubber Co. (Boston), with the help of the best talent obtainable in their cutting department and the utmost care in making and curing, are offering a well-fitting box-coat which is shown in the illustration. The backs are cut whole and full, the wide velvet collars fit closely in the neck, the large buttons to match the cloth and the fancy stitching on cuffs and pockets combine to make a very stylish and durable waterproof overcoat.

NEW MACKINTOSH BOX-COAT.

## THE WAVERLY CLINCHER TIRE.

THE Waverly is one that has many friends and has the reputation of being made on honor. It is claimed for it that it can be detached from the rim almost instantly, the inner tube taken out at any point, mended, returned to its place, and inflated in an exceeding brief space of time. Further than this it is light and resilient, will not creep, nor will it roll out of the rim. It is also claimed that it cannot come out in riding, even if it should be punctured and deflated. The manufacturers of this tire are pushing it very strongly, and making hosts of friends among wheelmen. The tires are made at their own factory, which adjoins their bicycle-works. Manufactured by the Indiana Bicycle Co., Indianapolis, Ind.


THE WAVERLY CLINCHER TIRE.

## A NEW MAGAZINE SHOOTING-VEST.

A CARTRIDGE-BELT is not only uncomfortable, but is said to be positively detrimental to health. At the same time sportsmen will carry cartridges, and it is likely that the majority of them will carry them in vests when once they appreciate the comfort and convenience of this method. As may be seen by a look at the illustration, the vest shown has eight vertical pouches, at the bottom of each being a tapered split brass tube, very strong and resilient. The shells are introduced into the top of the pouch, each holding six. The flanged head of the lowermost shell in each pouch, binds so firmly against the tapered tube that it is impossible to jar or shake the shell out, while it is easily extracted by the fingers. The vest is fitted with pouches on front or back or on both. It always keeps the "crimp" tight which is a necessity with nitro-shells. It is made of the best tan-duck, provided with pockets and flaps, is thoroughly waterproof, and thus is sure to protect the shells as well as the person of the wearer from dampness. Manufactured by the Fairfield Rubber Co., Fairfield, Conn.

## THE GOLF CAPE.

THE accompanying cut shows a unique waterproof garment. The shape is one that has taken greatly with the public of late. It is a practical garment, adapted particularly to any outdoor exercise and service,—driving, cycling, yachting, etc. While amply protecting the wearer on the shoulders and otherwise, it does not hamper in any way the freest use of the arms. It is called a golf cape because, unlike other garments, it can be used in such games as golf and tennis, a certain simple device attaching it safely to the body without interfering with the movements required by the games. Although the cut seems to represent a ladies' garment, it is in point of fact one which gentlemen can and do use with equal readiness and comfort. The cape is intended for both sexes. Ladies' garments are usually lined with fancy silks. They are made of heavy Scotch tweeds, there being a variety of appropriate designs for gentlemen. They are sold at various places, according to material. Manufactured and sold by the Birnbaum Rubber Co., No. 47 East Twelfth street, New York.

THE GOLF CAPE.

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MR. E. F. BICKFORD, of Malden, Mass., superintendent of the Boston Rubber Shoe Co., has signified his intention to give to the Malden Hospital a building for use as a nurses' dormitory, to cost $1500.

# OPPORTUNITIES FOR IMPROVEMENT IN MILL-ROOM PRACTICE.

*By Edward F. Bragg.*

DURING the past few years it has been my good fortune to be at times an interested spectator of the practical operations of many different mill-rooms. Unless one has had a similar experience, he has no idea what great differences they present to the close observer, not only in size, distribution of the machinery, and general design, but also in the character of the machinery itself. With hardly an exception, each mill has one or more especially good features wherein it excels the greater proportion of the others. But all present certain deficiencies which, if successfully overcome, would make a long step forward toward the perfection of the rubber machinery in common use.

The amount of work done by a common mixing-mill, warmer, or calender depends upon the surface-speed of the rolls in inches per minute, and the length of the line of contact between the two rolls. For example, let us take an ordinary mixing-mill, with rolls 15 inches in diameter, 40-inch face, running 15 revolutions a minute for fast roll and 8 for slow roll. The amount of rubber and compounds which this mill will mix during any given time depends upon the length of the line of contact, and the surface-speed of the slow roll per minute. Doubling the speed of this mill will double the product for a day's work,—or, the speed remaining the same, doubling the length of the rolls would double the product. Strength of materials prevents us from making the rolls with a working face of much more than 40 inches and still have the necessary strength and stiffness to withstand the heavy pressures created by the resistance of the rubber in passing through the rolls without increasing the diameter of the rolls to an impracticable extent. If we increase the diameter of the rolls to gain this necessary strength for a longer span between bearings, another difficulty presents itself. To illustrate, we will refer to the three diagrams herewith.

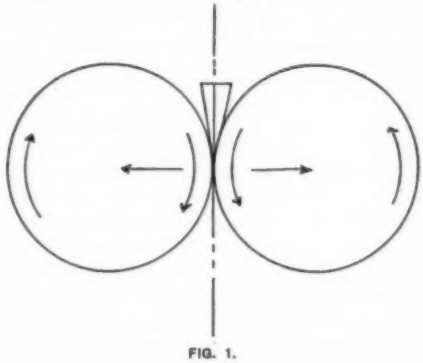

FIG. 1.

Figure 1 represents a pair of 15-inch rolls and Figure 2 represents a pair of 24-inch rolls, both drawn to scale. In each of these figures is drawn a wedge of the shape the rubber would take in passing through the rolls. The action of the rubber on the two rolls is a simple wedge-action tending to split them apart, in exactly the same manner in which an iron wedge would split a log. Every one knows that a slender wedge will split the largest log with comparatively few light blows, but a blunt wedge with a broad angle would scarcely produce any effect even with many heavy blows. In the mixing-mill the same thing occurs. The wedge is the rolling bank of rubber, slender in one case, blunt in the other The log to be split is the forcing apart of the two rolls. This means two things,—not only that the roll shall be increased in diameter sufficiently to have the same strength for the increased span between bearings, but also shall be increased still more in diameter to withstand the greatly-increased resistance of the rubber when in the shape of a narrow and powerful wedge instead of a blunt and weak one. This very increase in diameter to allow for the additional pressure of the rubber makes the wedge still more narrow and powerful, and the diameter must still be increased in strength on that account. This remedy rapidly aggravates the evil which it seeks to cure ; so that, in doubling a working face between bearings, the diameter must be increased enormously, making a very radical change in the shape of

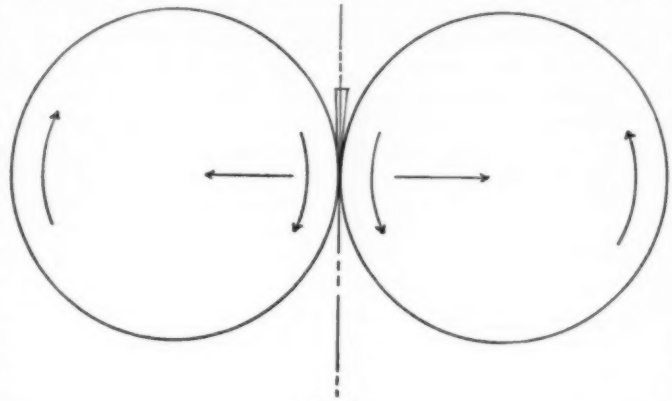

FIG. 2.

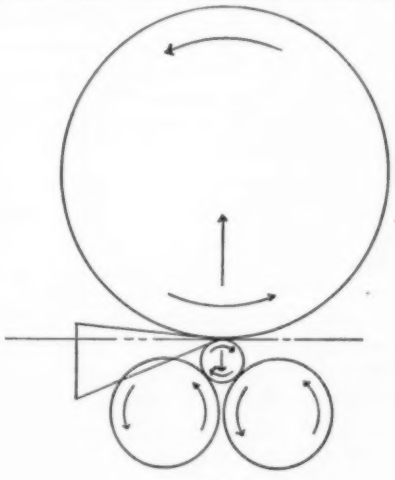

FIG. 3.

the wedge and increasing all the general proportions of the machine in order to give the necessary strength to withstand the enormous pressure created by the action of this slender but powerful wedge.

If the object sought were to split the machine, as in the case of the log, a wedge designed in this shape would be an admirable means to this end, but as the opposite is desired, a change in this direction is the worst possible move one can make,—for the purpose is to crush the wedge in the cheapest manner possible, not to split the machine. The latter can be avoided by using large quantities of metal in massive proportions to give the necessary strength for the required resistance, and if this were the only drawback to doubling the capacity of the present machines, having the same labor cost in operating as now, the few hundred dollars additional first cost which they would require would be no serious obstacle in their construction, considering the labor saving each year; but there is one consideration which makes their operation economically impossible. The power required for running the ordinary mill at the ordinary speed is about 15 horse-power. This is used up in two ways,—the internal work done upon the rubber, and the friction by the pressure of the rolls on the four bearings. The friction increases directly as the pressure, and, as we have seen, the pressure on these bearings when a slender wedge is used increases enormously, and this increases the friction and the consequent power on the bearings all out of proportion to the work done upon the rubber. So that a mill having the same surface speed, but having twice as long a working face as the old mill, would consume not twice the power but very much more than twice the power of the old mill. When power is generated in very large quantities and under the best conditions, such as pumping-stations, etc., an annual cost of $40 per horse-power is considered very good practice, and is what is aimed at but only occasionally obtained. As generated in the average rubber-mill, it costs nearly $55 per horse-power per annum. One may readily see that any saving made in labor may be more than lost in the additional coal bill.

This problem has been studied out, experimented upon and practically solved by people in another line of business, but in a case very similar to this. The copper-manufacturers, who produce many tons of cold rolled copper annually, used until a few years ago a pair of chilled rolls similar to the ordinary rubber rolls, but they experienced much difficulty from spalling and breaking, as well as the large amount of power necessary to drive them. Someone reasoned out the theory of the wedge and invented their present rolling mill. In place of the two large rolls, they now use four, as in Figure 3. The metal passes between the 22-inch and the 3-inch roll. The 3-inch roll is made of hardened steel to prevent its being crushed, and obtains its support from the 8-inch rolls, which practically are two rolling bearings upon which it rests. By this process the copper is rolled down by less power, with no breakages, and in much better shape. The sole reason for this result is because the wedge between the largest and smallest rolls is a blunt one with a broad angle. In the trade the large roll is known as the "anvil," and the small one as the "hammer," they considering the rolling process to be a succession of blows given so rapidly as to be continuous, which indeed it is.

This single illustration shows us conclusively that any increase in the diameter of the rolls is decidedly a change in the wrong direction, and that, if the peculiar conditions of the business would admit, a decrease in the present diameter of our rolls would be more advantageous than otherwise.

The other method of increasing the product by increasing the speed at once encounters the obstacle of heat. The present speed of the rubber-mill is already as fast as it can be driven without overheating and partially vulcanizing the rubber, so that the only hope of increase in economical production by the present mills lies in the discovery of some method of increasing our present power of cooling them. This method has recently been discovered and successfully applied with beneficial results. The old limit of speed, fixed by our power to control temperatures, disappears, and the present limit is the highest speed at which the workman is able to cut off his batch when done. This speed is nearly three times the present one. Let us suppose it is merely doubled. What is the result? We have cut our pay-roll in that department in halves, done away with one-half the mills, piping, shafting, foundation, and room, thereby saving the capital invested in them and the cost of repairs, and still possess a plant with the same capacity as before. None of the stock is injured from overheating or burning, so that, after the goods are vulcanized, the vulcanization of portions of them is not found to be more than that of others as at present, because this vulcanizing process had commenced and gone on to a greater or less extent upon overheated mills. One calender then would take the place of two, and the long waits now necessary in changing heats between the running of two different kinds of stock would disappear.

## THE AMAZON STEAM NAVIGATION CO.

REFERRING to the latest annual report of this company, of which some account was given in THE INDIA RUBBER WORLD last month, the *South American Journal* (London) says, editorially:

"The prosperity of this important company is closely identified with the development of one of the most extensive and naturally most richly gifted divisions of the great Brazilian territory. We have, therefore, come to regard its annual reports with special interest, the results of its operations affording a useful criterion of the progress of the vast regions watered by the majestic Amazon and its magnificent tributaries."

THERE is a new rubber store in Buffalo, N. Y.,—that of Choyer & Morse, No. 416 Main street. One of the proprietors, John L. Choyer, has been manager of G. D. Barr's store, in the same city, which has enabled him to acquire a good knowledge of the rubber business.

## A TRIFLE GOSSIPY.

MR. JOSEPH DAVOL, president of the Davol Rubber Co., receives occasional visits from an old Providence colored man, whom he has known since he was a boy. The old man is usually in need of assistance, which he invariably receives, either in the shape of a job at whitewashing which may or may not be necessary, or the "loan" of a dollar or two. Instead of calling down Heaven's choicest blessings on his benefactor's head, the old man has been accustomed to say, earnestly:

"Massa Davol, de day'll come when all dis will be returned with intres'. I'se gwine ter invent somefin in de rubber line dat will help yo' business powerful."

One day last winter he came to the factory in great excitement.

"I'se foun' dat invention, Massa Davol," he exclaimed. "Dat bread yo' done cast on de waters has come back a thousandfold."

"That's encouraging. What is it?" was the inquiry.

"Well, sah, dis mawnin', as I was ridin' in de street-kyar, it was cole, an' I like ter freeze, when all of a sudden I had a reverlashum. Here's all dose kyars cole as ice. Spose now yo' make a great big rubber bag, like one of dem hot-water bottles, as big as de bottom of de kyar, an' put it under de flo'; ain't dat gwine ter heat it? It is, shorely. An', Massa Davol, I gibs dat invention to yo', cause yo's been dreffful kind to de ole man."

* * *

MR. GEORGE HODGMAN, the senior member of the Hodgman Rubber Co., is quick to see a point and to put it in terse English. A young man calling at the store when trade was exceeding dull was met by Mr. Hodgman, who inquired as to the state of business.

"I think it is looking up," was the reply.

"So do I," said Mr. Hodgman; "just as a man lying on his back, dead, is looking up."

* * *

DURING a recent visit of several of the officers of the United States Rubber Co. to the mill of the National India Rubber Co. at Bristol, R. I., Mr. Joseph Banigan was observed taking great interest in an old press in the molding department. He looked it over, felt of it, sat down and watched it, until finally Mr. Coyle, manager of the company, began to feel ashamed for having such an ancient machine in a room with modern machinery, and began to explain why, when Mr. Banigan stood up, buttoned his coat, called the party together, and, pointing to the machine, said, "Gentlemen, there is the beginning of my experience in the rubber business. On that press I worked making rubber curry-combs when a young man." Then he went on giving a detailed account of his early experience in a manner that was full of interest; stating the small wages he received, and describing the different stages he passed through in an eloquent and impressive way, which held his listeners spellbound. This incident and the interesting description will long be remembered by those present, and it is needless to say that the National people now value the old press highly.

* * *

SOME years ago Harry Knowles, now sales-agent of the Globe Rubber Works, was quite ill with jaundice, and his physician sent him to a town in Maine to recuperate. As his was the only case of jaundice that the town held, and as he was about as yellow as a man could be and live, he was the object of considerable curiosity. An incident that occurred while there he still relates with much gusto. Two boys in the village below were discussing the best way to spend an approaching holiday.

"Let's go to the circus," said one.

"Circus be blowed," scornfully replied the other. "Let's go up to B—— and see the yaller man!"

* * *

WILLIAM LINCOLN SAGE, sales-agent for the Colchester goods is known as an enthusiastic and successful fisherman. Some worthy in the rubber trade not long ago sent him a series of six water-colors, representing fishing scenes that filled him with a mixture of indignation and delight. Scene one represented a stout bustling fisherman, on the banks of a stream, perspiring copiously, fishing vigorously, but with no luck. Number two pictured the same individual struggling homeward with empty basket. Number three lets one into the secret of his visit to the Quincy Fish Market, where he fills his basket. Four finds him at home enjoying the wonder and delight of his family over his wonderful catch. Five shows his worthy wife entertaining her neighbors with an account of her spouse's wondrous luck, illustrated by samples of the catch. Six points a moral. It represents the fisherman again approaching his favorite stream, only to find it lined with others, who have come for miles around to equal his famous catch. As yet no one has had the audacity to claim that these scenes are absolutely true to life, but Brother Sage seems exceedingly anxious to discover who perpetuated them.

* * *

IN the Boston office of the Boston Belting Co. there are two telephone-stations,—one at one end of the ware-rooms and the other in the office itself. It happened that one of the young men there discovered that if the two stations were connected the ends of the store could easily converse. He therefore resolved to have some fun with one of the traveling-men. J. F. Holt was the man whom he selected and whom he caused to be called to the store telephone. Mr. Holt went at once, and the following conversation passed between them.

OFFICE—Hullo, is that you Holt? This is Blank, of Chelsea—(Holt's pet customer).

HOLT (*most graciously*)—Good morning Mr. Blank. I recognized your voice at once. What is there new?

OFFICE (*roughly*)—New! Nothing, only that last lot of goods you sent me is worthless. I thought you looked out for your customers?

HOLT (*anxiously*)—Why I don't see how that can be. The order went in all straight.

OFFICE—Nonsense! It was rank carelessness and I don't propose to stand it. If you come here and straighten it out it will be all right. If you hurry you can catch me; I shall stay for five minutes yet.

HOLT—But you surely don't think that I can get to Chelsea in *five minutes?*

OFFICE—You seem to be hopelessly confused. Come to the front office, not to Chelsea.

HOLT (*after long pause*)—Is that you W——?

OFFICE—Yes; don't you recognize my voice?

HOLT—Confound you, you've turned my hair gray. Wat'll you have?

## TRADE AND PERSONAL NOTES.

THE stock of rubbers of the Brookhaven Rubber Co. who have withdrawn from the business of making shoes, has been purchased entire by W. L. Sage, of Boston. It is stated that the majority of the goods are arctics.

—Among the Massachusetts corporations recently dissolved according to law were the Hopedale Elastic Fabric Co. and the Rubber Boot and Shoe Selling Co.

—The Rubber Tire Wheel Co. have been incorporated at Springfield, Ohio, with $10,000 capital.

—The National Cycle Exhibition Co. have been incorporated at Chicago, by W. B. Latimer, Alfred E. Manning, and Jonah Cratty, with $25,000 capital.

—Julian Lowenthal, who until recently carried on business with James Doran, under the style of Loewenthal, Doran & Co., at 5 Irwell Chambers, Fazakerley street, Liverpool, dealing in India-rubber and other merchandise, has taken into partnership George F. Kroeber, and the business will be carried on as heretofore, under the firm name of Lowenthal, Kroeber & Co.

—The Lambertville (N. J.) Rubber Works are having built a two-story brick addition, 36×60 feet, to be completed by the middle of this month.

—The Boston Rubber Shoe Co. are sinking a well near their reservoir at Malden, Mass., for the purpose of getting soft water for use in their boilers.

—This piece of news comes through the Lowell (Mass.) *News:* "We read in the Boston *Journal* that Thomas Taylor, the Hudson manufacturer of elastic webbing, has advanced the wages of the workmen in his factory from 10 to 13 per cent. Thomas Taylor appears to care more about business than he does about politics."

—The sale is reported of the stock, tools, and machinery of the Tuttle Rubber-Works, at Holyoke, Mass., to Alfred B. Jenkins, of Jenkins Brothers, dealers in packing, No. 71 John street, New York. The sale was at auction, on July 19, and the price was $27,500. The latter firm have had considerable dealings with the Holyoke concern and the expectation is that the business will be continued on the old lines.

—Mr. Edward F. Bragg, president of the Automatic Rubber Mixer Co., contributes an article to this month's INDIA RUBBER WORLD on improved methods in mixing that every rubber-manufacturer should read. Mr. Bragg for several years has made a close study of the mixing of rubber compounds. Further than this, he has visited most of the rubber factories in the United States, and spent considerable time in their mill-rooms. For these reasons his deductions are of value, and will undoubtedly be read with interest and profit.

—To inquirers after "blue-lead fumes" we would say that George T. Lewis & Sons, Provident building, Philadelphia, are manufacturers of this product. They write us: "I beg to say that our firm have been supplying some of the largest rubber manufacturers in the country with this article. Glad to send you samples."

—The Metropolitan Rubber Co. (Cleve & Krim), of Boston, have taken the New England agency for the Hygienic air-mattress, manufactured by the Metropolitan Air Goods Co. They will carry a full stock of these goods at their Summer-street store.

—Mr. George H. Barrus, the well-known expert steam engineer of Boston, has just completed a careful test on a 250-horse-power Stirling boiler at Portland, Me., with the following results.

| | |
|---|---|
| Water evaporated per pound of coal | 10.54 lbs. |
| Equivalent evaporation per pound of coal from and at 212° | 11.025 lbs. |
| " " " " combustible " " | 12.061 lbs. |
| Moisture in steam while boiler was developing 380 H. P., or 52% above its rated capacity | 0.19% |
| Moisture in steam while boiler was working at its rated capacity | 0.06% |

—Boot and shoe retailers should bear in mind that there will be an advance in price on rubber footwear after September 1.

—A new machine for the manufacture of leather bicycle-saddles utilizes a former of rubber for getting the leather into the proper shape. This former weighs about five pounds, and is shaped like a miniature anvil. It is made of a cheap grade of stock, as it does not need to possess elasticity in a marked degree.

—The Eastern Rubber Co. (Trenton, N. J.) have been fortunate enough to secure many large orders in the west and have been working over-time for several weeks past. Among other orders, they have a large order for rubber corks for beer bottles.

—The business of the firm of George P. Holmes & Co., Chicago representatives of the Boston Rubber Shoe Co., is not to be disturbed by the recent death of Mr. Holmes. The old firm name is to be retained, and the management will be in the hands of A. F. Solbery, who has long been connected with the house.

—Charles T. Wood has given up his position with the Stoughton Rubber Co. (Boston) and gone back to his former line, a general rubber business on a commission basis. He has offices at No. 67 Chauncy street, Boston, and with his wide acquaintance will undoubtedly secure his share of the rubber business of New England.

—The Manhattan Rubber Manufacturing Co. are building a large addition to their rubber-mill at Passaic, N. J. The floor-space of their factory will be increased considerably by the addition, which is to be 80 feet on one side and 100 feet on another side of the present main building. Some time ago it was found necessary to build a new machine-house outside of the main building, and now a further and greater enlargement is called for. It has been found impossible to do the business of the company economically and properly in the present mill. The company have had to work nights in order to attend to the orders. The new parts are expected to be ready by September 1, the contract having been awarded and the work begun. The company will probably increase their force by employing about fifty new workmen. Mr. Townsend, the treasurer, said that business has been very good for the last few months, but more quiet in the second half of June, July being the time for taking stock.

—The "Whippet" improved tire, of the New York Belting and Packing Co., Limited, was put to a severe test up in New York state recently. Two stalwart riders started out for a two-weeks' tour, in all kinds of weather, and over all kinds of roads, including railroads, bridges, etc. They must have ridden 1200 or 1500 miles during the tour, and, when the tires were examined after they had come in, not a single defect was noticeable. They had "stood up" admirably under the hardest usage.

—The Boston *Commercial Bulletin* claims to have inside information that the United States Rubber Co., during its last fiscal year, earned, above all charges and the preferred dividend, about 10 per cent. on the common stock, and that in all probability common stockholders will begin to receive dividends in 1895.

—The Peters Rubber and Supply Co. have been organized in St. Louis with $10,000 capital stock. The incorporators are C. C. Peters, D. A. Biggers, and James A. Ruame.

—Mr. Edward H. Alcott is no longer connected with the Chinnock Pneumatic Tire Co., whose vice-president and general manager he was up to the middle of July. He has also severed his connection with the Eastern Rubber Co., of Trenton, N. J. He retains his connection with the Empire Rubber Co., whose selling-agent he is.

—The Manhattan Rubber Co., whose factory is at Passaic, N. J., have been running overtime in their molded goods department, and have been kept busy in all other departments.

—The Gutta Percha and Rubber Manufacturing Co. started to run full time on Monday, July 30. Before that date, they had been running eight hours a day.

—The Puncture-Proof Pneumatic Tire Co (Ltd.), of London, England, represented in this country by the Chinnock Pneumatic Tire Co., claim that the various tire-protectors placed on the market lately by American companies are infringements on their patent, and threaten to bring suits against the alleged infringers.

—The Goodyear Rubber Manufacturing Co. exhibit in their up town store, Nos. 503-505 Broadway, the largest "biscuit" of pure Pará rubber that has ever been on the market. It weighs 1181 pounds. It was intended for the Chicago Exhibition, but came too late, and the company bought it and put it in one of their windows. The public view it with considerable curiosity.

—The Ellaterite Rubber Manufacturing Co. have been organized at Denver, Col., with $5000 capital, by W. H. Perry, W. H. Delins, and A. J. Gregory. They will exploit the so-called Utah mineral rubber.

## RUBBER SALESMEN.

MR. ROSS C. KING, representing the New York Belting and Packing Co., Limited, No. 15 Park row, is sending a unique card of advance notice to his trade. It reads as follows: "Are you on the grind? I ll be on the ground—with the Vulcanite Emery Wheel, Fast and Safe." This little skit is attracting considerable attention among consumers of emery wheels.

—Mr. William H. Corner, Jr., the well-known New York representative of the Boston Rubber Co., was attacked by illness on the streets of Cincinnati on July 27, while leaving the rubber store of A. C. Cattell & Co. He was conveyed first to his hotel and thence to a hospital, where he was treated for a severe case of congestion of the lungs. He did not lack for the attentions of friends, many traveling-men stopping as they passed Cincinnati to see him. He went to the mountains of Pennsylvania to recuperate as soon as he was able to leave the hospital.

—In reply to an inquiry we will state that Studley Brothers, of Providence, R. I., dissolved partnership on May 1. Colonel J. M. Studley continues the business at No. 37 Westminster street under the name of Studley & Co. Mr. J. M. Studley leaves the rubber business and goes into real estate, and is also agent for the Minnesota Saving Fund and Investment Co., with offices at No. 107 Westminster street, Providence.

## TRADE PUBLICATIONS.

"YOU may never be real sick, but you ought to keep something in the house." This striking bit of worldly wisdom adorns the cover of a pamphlet that comes in the Editor's morning mail. When one opens it to pursue the idea that this subtle warning has implanted, one finds that the pages are given up to illustrations and suggestions concerning certain valuable adjuncts to the toilet and sick room, known to the public as druggists' sundries. The cuts and reading matter are many times ludicrous in the extreme, and when they are seen by the man who hates a laugh, he will tear his hair, but he will remember the goods advertised all the same. On the other hand, those who enjoy a little seasoning of fun in the dry routine of business, will look on every page, and under the humorous description will see the program, business-like motive of a catalogue gotten up in this style. Published by the B. F. Goodrich Rubber Co., Akron, Ohio.

—A neat pamphlet descriptive of the Evertite tires is what every wheelman would certainly value. It describes five types of the Evertite tire, tells what materials are used in the tires, how they are to be used, and their special excellencies. This tire as applied to sulky-wheels is the theme of a business like talk, while inner tubes, pedal rubbers and general bicycle sundries in rubber, fill up several pages. Published by the Boston Woven Hose and Rubber Co., Boston.

## INDIVIDUAL MENTION.

MR. F. A. KRIM, of Cleve & Krim, proprietors of the Metropolitan Rubber Co. (Boston), is to spend his summer vacation at South Duxbury,—a paradise for those who enjoy fishing, sailing, and clam-bakes.

—Mr. E. E. Leach, proprietor of Leach's Rubber store, Boylston street (Boston), has just returned from a two weeks' outing at Carry Ponds, Maine. He had for fishing partner Mr. Lyman George, who was formerly one of the staff of the Metropolitan Rubber Co. in New York. They caught eight hundred trout.

—Mr. D. S. Pratt, manager of the Elastic Tip Co. (Boston), was fortunate enough to secure a 4½-lb. "square tail" trout at Moosehead Lake this summer, which is about as large as that variety of trout grow in those waters.

—Mr. G. P. Whitemore, of the Boston Belting Co., will spend his vacation at Bath, Maine.

—Mr. S. Lewis Gillette, manager of the clothing department of the American Rubber Co., goes into the woods about twenty miles north of Moosehead Lake, Maine, for his summer's outing.

—Mr. Robert Cowen, of the Boston Woven Hose and Rubber Co., takes two or three days at a time at Plymouth during the hot season. His chief recreation there is yachting.

—Mr. Eben Paine, sales-agent of the American Rubber Co., has a beautiful cottage at Scituate beach, Mass., and although he is at the Boston office every day he is getting a genuine sea-shore tan.

—Mr. H. C. Corson, vice-president and treasurer of the B. F. Goodrich Co., Akron, Ohio, is spending his summer holiday in Europe.

—Mr. A. L. Kelley, treasurer of the Mechanical Fabric Co. (Providence, R. I.), has been obliged to take a few weeks' rest, but is improving rapidly, and will soon be at his post again.

—Mr. David Hale (Boston) has been confined to his home in Walpole for some little time past by a severe attack of rheumatism.

—The editor of THE INDIA RUBBER WORLD was standing in the gymnasium of the Providence Athletic Club recently and was pleased to see that the only rubber man present, Mr. William B. Banigan of the Marvel Rubber Co., outclassed every other ball-thrower present. Under his propulsion the heavy *lignum vitæ* ball went singing up the wire till it hit the rubber cushion hid among the rafters. The others sent it about two-thirds of that distance.

—The engagement is announced of Mr. I. H. Sawyer, of the Brown Shoe Co. (St. Louis), to Miss Bertha A. Colby of the treasurer's office of the American Rubber Co., in Boston.

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"GUM boots repaired," a Ridge-avenue window sign, is in hard luck during weather like this.—*Philadelphia Record.*

## THE CENTRAL AMERICAN CAOUTCHOUC CO.

THIS company, now in process of liquidation, was organized in New York about ten years ago for the purpose of engaging in rubber-production in British Honduras. It obtained a grant covering the entire territory of Honduras, but which was operated chiefly along the Black river.

As described by the receiver, the organization of the company was an experimental undertaking, and the steps now being taken for its legal extinction are due to the discovery that its operations must always remain unprofitable.

In the first place the quality of India-rubber produced in Honduras is not of the best. It is an article, in quality between that of other India-rubber and Gutta-percha, known as *tuno*, and it is suitable for only a few independent uses. It is thought good for insulating purposes, but it has never been developed for this service and has been used mainly as a backing for the better quality of rubber in such manufactures as do not require a solid body of the best. This restricted the operation of the company from the beginning, and greatly reduced the chances of success.

Nevertheless, like the luck of a beginner at cards, the first operations of the company seemed quite encouraging. Some heavy orders from manufacturers were received, and it looked for a time as if the experiment might be successful. The undertaking was felt by the promoters to be a gamble at best, and so long as the cards ran in their favor they were happy and content.

But just here a new complication enters. There seems to be no certainty about the supply. Labor is proving itself to be a very uncertain quantity everywhere. In this latitude it strikes and lays off as soon as the laborer begins to feel himself too rich; but in the tropics it lays off without the formula of a strike when corresponding conditions prevail, and it takes little to bring the conditions in a climate where men can live on bananas and wear their bathing habiliments. Hence, it soon arrived that the company found itself unable to know whether it was to have fifty pounds or fifty thousand pounds of its peculiar quality of rubber a month, and, no matter what the extent of the orders, there was no certainty that the product could be delivered. This complication, probably more than the second-rate quality of the merchandise produced, is what led the company to determine upon liquidation. It was not thought that the rubber was the right quality of rubber to produce in the first place, and in the next place it was almost impossible to produce it, whatever the quality.

On this statement of the case it will be seen that there will be no reorganization. The Central American Caoutchouc Co. has had its gamble and lost, and there is no disposition among the members either to find new victims and unload or to run their bad luck.

In one of the New York courts last month William MacNeven Purdy, of No. 144 Nassau street, was appointed receiver of this company. He was formerly its treasurer. The company was incorporated in 1883, with a capital stock of $24,000, and it formerly had an office at No. 44 Beaver street, New York.

## WILL BE MADE AT WOONSOCKET.

SAYS the *Colchester Advocate:* "Several months ago the United States Rubber Co. bought the plant of the Colchester Rubber Co. in this place. Soon after this purchase President George Watkinson of the Colchester Rubber Co. was elected assistant general manager of the United States Rubber Co. with headquarters at Providence. Later on he found that his duties there would prevent his giving the business at Colchester requisite attention. He therefore found it to his interest not to resume work in Colchester, at least for the present, but to have the goods made at some factory near to Providence, where he could look after them in connection with his general duties. Several factories were offered and have been under consideration for a few weeks, resulting in a recent decision in favor of the Woonsocket mills as being the most eligible for the purpose."

The offices of the Colchester Rubber Co. are now in the Industrial Trust Building, Providence, on the floor below the general offices of the United States Rubber Co.

## A RUBBER-TIRED WAGON IN TOLEDO.

TO THE EDITOR OF THE INDIA RUBBER WORLD: We have read from time to time all of your articles on "Rubber Tires for Carriages," and, knowing that you are interested in this subject, we send you several notices from our local newspapers on a road-wagon the wheels of which are fitted up with ball-bearings and 1½" pneumatic tires. We are using this wagon daily over the rough pavements, car-tracks, etc., with satisfactory results. The service that the tires are giving is far beyond our expectation, and we pronounce them a success, and look forward to the day when the majority of vehicles will be fitted up in like manner. TOLEDO RUBBER CO.

Toledo, Ohio, August 2, 1894.

[THE above letter, from Mr. T. H. Deordorff, the secretary of the company, enclosed some paragraphs from the Toledo *Sunday Journal*, complimenting the firm for their enterprise in being the first to introduce a rubber-tired vehicle in that city. "The tires are of the regulation kind attached to racing sulky wheels, with the exception that they are made heavier," says one writer. "The wagon rides like a hammock, and sits as easy and comfortable as though one were riding on air, which indeed is the case. Not only this, but the absence of noise is noticeable and adds much to the comfort of the rider."—THE EDITOR.]

## RUBBER ON BRAZILIAN UPLANDS.

TO THE EDITOR OF THE INDIA RUBBER WORLD: Referring to the discussion in your pages of the question "Do the Amazonian Rubber-Trees Grow on Uplands?" I should say that, if "seeing is believing," they do. Not, of course, so well or so freely as in *terrenos algados* (the low-lands). It is singular that two such eminent botanists as Von Martius and Pöppig should state positively that the *Hevea discolor*, at least, is found only in the lowlands. To support my assertion I have the best Paraense and Amazonense authorities; also, that of Mons. E. Chapel (see his work "Le Caoutchouc et la Gutta-Percha"). To be sure, the word "uplands" in the Amazonian rubber country has much latitude, being often applied to *terra firma*—that is, land that is not submerged.

M. F. SESSELBERG.

Pará, Brazil, July 9, 1894.

[WHILE the work by Mons. Chapel, above referred to, is one of value, we are not aware that its author claims to be an authority as a botanist, and it is our impression that he has not personally visited the rubber countries. THE WORLD will welcome any further contributions to the literature of this subject. —THE EDITOR.]

# REVIEW OF THE RUBBER MARKET.

IT will be seen, from a glance at the prices of crude rubber in New York printed below, that the changes from the figures presented one month ago are so few as to make any extended review of the situation unnecessary. Pará arrivals during the month have been light, but stocks in sight have not been diminished perceptibly. The only active consumption of rubber has been in the shoe-factories, which have been unusually active for the summer months, but it is asserted by the brokers that manufacturers in this line have been light buyers since February, indicating that they have had liberal reserve supplies of crude rubber. If, as now seems apparent, the shoe-factories should shut down at the end of summer—owing to the liberal orders received and filled during the warm months as the result of the special 5 per cent. discount to jobbers—the American demand for rubber, instead of improving, will take the opposite course.

The government statistics for the last fiscal year tell the story of the decreased business in rubber for this period in a style that can readily be understood. The total imports of India-rubber (excluding Gutta-percha) for the past four years are stated as follows:

| | 1890-91. | 1891-92. | 1892-93. | 1893-94. |
|---|---|---|---|---|
| Imports (pounds). | 33,712,089 | 39,976,205 | 41,547,680 | 33,757,783 |
| Exports | 1,041,300 | 1,600,834 | 1,072,369 | 2,344,536 |
| Net imports | 32,670,789 | 38,375,371 | 40,475,311 | 31,413,247 |

With regard to general business conditions, which have an effect more or less direct upon the business of rubber-manufacture, the remarks made in these columns last month may be referred to as still applicable.

The latest quotations in the New York market are:

| | | | |
|---|---|---|---|
| Pará, fine, new t a | 65@67 | Sierra Leone | 20@38 |
| Pará, fine, old | 69@72 | Benguela | 43@44 |
| Pará, coarse, new t a | 42@52 | Kongo Ball | 37@40 |
| Pará, coarse, old | | Camaroon Ball | 34@36 |
| Caucho (Peruvian) strip | 43@44 | Flake, Ord. and Lump | 24@25 |
| Caucho (Peruvian) ball | 47@48 | Accra Flake | 14@15 |
| Mangabeira, sheet | 35@38 | Liberian Flake | 21 |
| Esmeralda, sausage | 46 | Primest Pinky Madr | 58@60 |
| Guayaquil, strip | 27@33 | Madagascar, black | 42 |
| Nicaragua, scrap | 44@46 | Borneo | 26@40 |
| Nicaragua, sheet | 42 | Gutta-percha, fine grade | 1.30 |
| Thimbles | 35@36 | Gutta-percha, medium | 1.00 |
| Tongues | 30@35 | Gutta-percha, hard white | 85 |

The statistical position of Pará rubber in New York and elsewhere is as follows, the figures expressing tons:

| | Fine and medium. | Coarse. | Total. |
|---|---|---|---|
| Stock, June 30, 1894 | 1109 | 50 | 1159 |
| Arrivals, July | 127 | 139 | 266 |
| Aggregating | 1236 | 189 | 1425 |
| Deliveries, July | 201 | 136 | 337 |
| Stock, July 31 | 1035 | 53 | 1088 |
| Stock in England, July 31 | | | 1255 |
| Deliveries in England, July | | | 400 |
| Pará receipts, July | | | 680 |
| Stock in Pará, July 31 | | | 100 |
| World's supply, July 31 [Excluding caucho.] | | | 3061 |

PRICES FOR JULY.

| | 1894. Fine. | 1894. Coarse. | 1893. Fine. | 1893. Coarse. | 1892. Fine. | 1892. Coarse. |
|---|---|---|---|---|---|---|
| First | 66 | 44½ | 67 | 42 | 68 | 46 |
| Highest | 66 | 44½ | 67 | 43 | 68 | 46 |
| Lowest | 65 | 42 | 66 | 40 | 67 | 43 |
| Last | 65 | 42 | 66½ | 42 | 67 | 43 |

In regard to the financial situation Messrs. Simpson & Beers, brokers in crude India-rubber and commercial paper, New York, advise us as follows:

"The rates for prime bills receivable still rule at 3 and 3½ per cent. and for first-class single name notes at 5 and 5½ per cent. and all 3 to 6 months maturity and notwithstanding continued heavy exports of gold. These prolonged low rates at the latter part of the summer are owing to the general depression in business, resulting from the uncertainty in tariff legislation which retards business ventures and restricts the demand for money.

## AFRICAN RUBBER—LIVERPOOL.

TO THE EDITOR OF THE INDIA RUBBER WORLD: The market for medium descriptions has been dull and the sales which have taken place mark a decline of ¼*d.* @ ½*d.* per pound. Prime Accra Oysters are coming in more plentifully and have been sold at 1/10. Caucho Slab is offering at 1/8 and Thimbles have been sold at 1/4¾. To-day's quotations are as follows:

| | | |
|---|---|---|
| Soft Liberian | 11 | @ 11¼*d.* |
| Soft Liberian (pasty) | | 7*d.* |
| Hard Liberian | 1/1½ | |
| Accra, Cape Coast and Saltpond Biscuits of fair quality | 1/8 | @ 1/9 |
| Accra Biscuits, best quality | 1/10 | |
| Addah Niggers | 1/8 | |
| Prime selected Sierra Leone Niggers | 1/5 | @ 1/6 |
| Extra prime ditto | 2/ | |
| Grand Bassam and Assinee | 1/3 | @ 1/3½ |
| Prime Gambia Niggers | 2/0½ | @ 2/1 |
| Cameroon Clusters | 1/5 | @ 1/7 |
| Large Cameroon or Batanga Ball | 1/4 | |
| Best Kongo Ball | 1/9 | @ 1/9½ |
| Gaboon Ball or second Kongo Ball | 1/5½ | @ 1/6 |
| Thimbles | 1/4¾ | @ 1/5 |
| Old Calabar | 1/1 | @ 1/1½ |
| Benguela Niggers c. i. f. New York | 1/8¼ | @ 1/8½ |

In the London market good medium Rubber is scarce, while low qualities are abundant and difficult of sale.

LIVERPOOL RUBBER STATISTICS FOR JULY.

| | Pará grades. | Africans. |
|---|---|---|
| Stocks, June 30 | 3,203,200 | 1,299,200 |
| Arrivals during July | 495,040 | 952,000 |
| | 3,698,240 | 2,251,200 |
| Stocks, July 31 | 2,806,720 | 1,322,840 |
| Deliveries during July | 891,520 | 928,360 |
| As against deliveries during June | 1,102,080 | 687,680 |

The stock of Pará rubber July 31 consists of:

| | Fine. | Entre-fine. | Negroheads. | Total. |
|---|---|---|---|---|
| First hands | 743 | 160 | 170 | 1,073 tons. |
| Second hands | 138 | 25 | 17 | 180 " |
| Total | 881 | 185 | 187 | 1,253 " |

Stock of Ceará rubber on July 31, 97 bales; stock of Peruvian rubber, 24 tons.

Liverpool, August 1, 1894.

## GOULD COMMERCIAL CO.'S STATISTICS.

IMPORTS FOR JULY (BY TONS).

| GRADES. | New York. | Boston. | Total. |
|---|---|---|---|
| Parás | 293 | 8 | 301 |
| Centrals | 87 | .. | 87 |
| Africans | 86 | 40 | 126 |
| East Indian | 83 | .. | 83 |
| Totals | 549 | 48 | 597 |

## IMPORTS FROM PARA.

THE imports in detail of rubber direct from Pará at the port of New York, since our last report, have been as follows, all quantities being expressed in pounds:

**July 24.**—By the steamer *Cearense*, from Pará:

| | Fine. | Medium. | Coarse. | Caucho. | Total. |
|---|---|---|---|---|---|
| Reimers & Meyer | 58,500 | 10,000 | 68,100 | 8,000 | 144,600 |
| New York Commercial Co. | 54,100 | 4,300 | 68,000 | 5,200 | 131,600 |
| Lawrence Johnson & Co. | 13,500 | 1,300 | 29,400 | ..... | 44,200 |
| Joseph Banigan | ..... | .... | 17,400 | ..... | 17,400 |
| Shipton Green | 5,300 | 300 | 2,400 | ..... | 8,000 |
| Total | 131,400 | 15,900 | 185,300 | 13,200 | 345,800 |

| | |
|---|---|
| July Imports from Pará | 645,300 |
| June Imports | 1,591,300 |
| May Imports | 926,300 |
| April Imports | 2,566,868 |
| March Imports | 2,177,400 |
| February Imports | 2,309,402 |
| January Imports | 3,750,000 |

OTHER PARA ARRIVALS.

**July 10.**—By the steamer *Irrawaddy*, from Bolivar:

| | | | | | |
|---|---|---|---|---|---|
| J. Agostini | 4,800 | ..... | 2,000 | ..... | 6,800 |

**July 11.**—By the steamer *Prussia*, from Hamburg:

| | | | | | |
|---|---|---|---|---|---|
| Reimers & Meyer | ..... | ..... | ..... | .... | 4,061 |
| Otto G. Mayer & Co. | ..... | ..... | ..... | ..... | 5,158 |

**July 27.**—By the steamer *Lucania*, from Liverpool:

| | | | | | |
|---|---|---|---|---|---|
| Reimers & Meyer | ..... | ..... | ..... | ... | 10,000 |

## OTHER NEW YORK ARRIVALS.

BELOW will be found in detail the imports at New York, during July, 1894, of India-rubber from Mexico, Central America, and South America, other than Pará grades; also, arrivals at New York of African and East Indian sorts:

### CENTRALS.

| | POUNDS. |
|---|---|
| JULY 2.—By the *Seneca*=Tuxpan: | |
| H. Marquardt & Co | 300 |
| J. Menendez & Co | 1,400 |
| Total | 1,700 |
| JULY 2.—By the *Habana*=Vera Cruz: | |
| H. Marquardt & Co | 150 |
| JULY 1.—By the *Newport*=Aspinwall: | |
| A. Santos & Co | 5,880 |
| Roldan & Van Sickle | 3,612 |
| Lanman Kemp | 600 |
| Dumarest & Co | 541 |
| F. Probst & Co | 430 |
| W. R. Grace & Co | 2,689 |
| R. E. Britton & Co | 2,075 |
| C. R. Flint & Co | 8,754 |
| A. N. Rotholz | 1,781 |
| H. W. Peabody | 200 |
| New York Commercial Co. | 700 |
| J. Aparicio & Co | 620 |
| Total | 28,882 |
| JULY 4.—By the *Miranda*=Belize: | |
| A. S. Lascelles & Co. | 2,300 |
| Eggers & Heinlein | 2,200 |
| Mandell & Co. | 100 |
| S. Samper & Co | 2,500 |
| E. Boyle | 800 |
| Munoz & Espriella | 2,500 |
| G. Amsinck & Co | 5,500 |
| G. Canton | 5,500 |
| James Rankine | 2,900 |
| Total | 24,200 |
| JULY 10.—By the *Hudson*=New Orleans: | |
| Cerf, Hirsch & Co. | 1,800 |
| JULY 9.—By the *Seguranca*=Tuxpan: | |
| J. Agostini | 400 |
| G. Amsinck & Co. | 400 |
| J. W. Wilson & Co. | 400 |
| H. A. Forrest & Co. | 1,200 |
| L. Monjo, Jr., & Co | 150 |
| Graham, Hinkley & Co | 150 |
| Total | 2,700 |
| JULY 10.—By the *Alps*=Cartagena, etc.: | |
| W. R. Grace & Co | 1,000 |
| Kuhnhardt & Co. | 200 |
| Punderford & Co. | 300 |
| Total | 1,500 |
| JULY 12.—By the *El Sol*=New Orleans: | |
| Earle Brothers | 4,300 |
| JULY 12.—By the *Alliance*=Colon: | |
| A. Santos | 12,900 |
| Piza, Nephews & Co. | 2,500 |
| I. Brandon & Brother | 1,200 |
| Pomares & Co | 100 |
| J. M. Ceballos & Co. | 3,900 |
| H. Marquardt & Co | 100 |
| New York Commercial Co. | 4,600 |
| R. F. Cornwall | 3,000 |
| G. Amsinck & Co. | 500 |
| Total | 28,800 |
| JULY 16.—By the *Alvena*=Port Limon: | |
| A. N. Rotholz | 150 |
| JULY 17.—By the *El Sud*=New Orleans: | |
| W. H. Crossman & Co. | 2,200 |
| JULY 18.—By the *Yucatan*=Tampico: | |
| J. W. Wilson & Co. | 150 |
| JULY 21.—By the *Creole Prince*=Port Spain: | |
| A. D. Strang & Co. | 200 |
| JULY 23.—By the *Advance*=Colon: | |
| A. Santos & Co. | 16,394 |
| J. Brandon & Brother | 1,135 |
| Hirzel, Feltman & Co. | 173 |
| To Order | 811 |
| Hoadley & Co. | 6,427 |
| W. R. Grace & Co. | 1,030 |
| E. E. Britton & Co. | 3,000 |
| G. Amsinck & Co. | 2,300 |
| Roldan & Van Sickle | 1,675 |
| New York Commercial Co. | 3,500 |
| C. R. Flint & Co. | 7,960 |
| Samper & Co. | 929 |
| Dumarest & Co. | 1,720 |
| Munoz & Espriella | 9,906 |
| Total | 50,965 |
| JULY 23.—By the *Yumuri*=Tuxpan: | |
| J. Agostini | 150 |
| Coombs, Crosby & Eddy | 150 |
| Total | 300 |
| JULY 22.—By the *Andes*=Cartagena: | |
| Schulz & Ruckgaber | 450 |
| JULY 24.—By the *Maskelyne*=Bahia: | |
| New York Commercial Co. | 16,600 |
| Reimers & Meyer | 3,800 |
| Total | 20,400 |
| JULY 26.—By the *El Dorado*=New Orleans: | |
| Andreas & Co | 1,500 |
| JULY 27.—By the *Hubert*=Maranham: | |
| W. H. Crossman & Bro. | 200 |
| JULY 30.—By the *Bellucia*=Bahia: | |
| Reimers & Meyer | 5,200 |
| JULY 31.—By the *Hudson*=New Orleans: | |
| W. R. Grace & Co. | 2,000 |
| Total Centrals | 176,747 |
| Total Centrals for June | 212,186 |
| Total for May | 174,905 |

### AFRICANS.

| | POUNDS. |
|---|---|
| JULY 5.—By the *Britannic*=Liverpool: | |
| George A. Alden & Co. | 18,178 |
| JULY 5.—By the *Umbria*=Liverpool: | |
| Reimers & Meyer | 41,810 |
| JULY 5.—By the *Moravia*=Hamburg: | |
| George A. Alden & Co. | 6,679 |
| JULY 11.—By the *Majestic*=Liverpool: | |
| Reimers & Meyer | 7,304 |
| JULY 11.—By the *Westernland*=Antwerp: | |
| George A. Alden & Co. | 3,289 |
| JULY 11.—By the *Campania*=Liverpool: | |
| Reimers & Meyer | 17,047 |
| JULY 11.—By the *New York*=Liverpool: | |
| George A. Alden & Co. | 8,392 |
| JULY 11.—By the *Prussia*=Hamburg: | |
| George A. Alden & Co. | 13,449 |
| JULY 19.—By the *Germanic*=Liverpool: | |
| Reimers & Meyer | 7,995 |
| W. A. Brown & Co | 3,353 |
| JULY 19.—By the *Servia*=Liverpool: | |
| Reimers & Meyer | 10,409 |
| George A. Alden & Co | 45,035 |
| H. H. Smythe | 4,646 |
| JULY 27.—By the *Lucania*=Liverpool: | |
| Reimers & Meyer | 30,000 |
| JULY 27.—By the *Scandia*=Hamburg: | |
| George A. Alden & Co | 22,691 |
| Reimers & Meyer | 5,124 |
| JULY 27.—By the *California*=Hamburg: | |
| George A. Alden & Co. | 2,051 |
| Reimers & Meyer | 1,569 |
| JULY 27.—By the *Taurie*=Liverpool: | |
| George A. Alden & Co. | 18,865 |
| H. H. Smythe | 998 |
| Total Africans | 269,792 |
| Total Africans for June | 324,908 |
| Total Africans for May | 363,037 |

### EAST INDIAN.

| | POUNDS. |
|---|---|
| JULY 5.—By the *America*=London: | |
| George A. Alden & Co | 12,110 |
| Ralli Brothers | 3,292 |
| JULY 5.—By the *Massachusetts*=London: | |
| Reimers & Meyer | 16,770 |
| George A. Alden & Co. | 2,550 |
| JULY 11.—By the *Furnessia*=Glasgow: | |
| George A. Alden & Co. | 15,718 |
| JULY 19.—By the *Paris*=England: | |
| Reimers & Meyer | 9,344 |
| JULY 19.—By the *Port Philip*=Singapore: | |
| R. Soltau | 26,133 |
| Reimers & Meyer | 41,456 |
| George A. Alden & Co. | 60,267 |
| JULY 27.—By the *Manitoba*=London: | |
| George A. Alden & Co. | 191 |
| JULY 27.—By the *Glencarn*=Singapore: | |
| Reimers & Meyer | 7,093 |
| Windmuller & Roelker | 23,807 |
| Total East Indian | 218,731 |
| Total East Indian for June | 51,121 |
| Total for May | 68,996 |

## BOSTON ARRIVALS.

| | POUNDS. |
|---|---|
| JULY 2.—By the *St. Ronans*=London: | |
| George A. Alden & Co., Africans | 8,400 |
| JULY 3.—By the *Catalonia*=Liverpool: | |
| George A. Alden & Co., Africans | 6,130 |
| Reimers & Meyer, Pará | 11,500 |
| Reimers & Meyer, Africans | 4,000 |
| JULY 10.—By the *Roman*=Liverpool: | |
| George A. Alden & Co., Pará | 11,400 |
| JULY 16.—By the *Pavonia*=Liverpool: | |
| United States Rubber Co., Africans | 15,000 |
| JULY 17.—By the *Venetian*=London: | |
| George A. Alden & Co., Africans | 2,470 |
| Total Africans | 36,000 |
| Total Pará | 22,900 |
| Total for Boston | 58,900 |
| Total Boston for June | 20,500 |
| Total for May | 21,280 |
| Total for April | 135,100 |
| Total for March | 111,250 |
| Total for February | 154,140 |
| Total for January | 58,600 |

## NEW ORLEANS.

JULY.

| | POUNDS. | VALUE. |
|---|---|---|
| From Nicaragua | 13,231 | $5,137 |